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ПРОФЕССИЯ ИНЖЕНЕРОВ-СТРОИТЕЛЕЙ В 21 ВЕКЕ

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Результаты труда инженеров-строителей нас окружают повсюду. Это шоссе, железные дороги, жилые дома, школы, больницы, водопроводы и газопроводы и многое, многое другое. Быстрое развитие технологий и новейшие научные достижения вносят вклад в изменения на рынке труда. Для того, чтобы быть успешным специалистом в XXI веке, от специалиста требуются новые качества. Подготовка специалистов в стенах университета занимает от четырех до шести лет. Но этого не достаточно. Непрерывно появляются новые строительные материалы и новые технологии. Кроме того, подвержены изменениям также и условия окружающей среды. Все это предъявляет дополнительные требования к способности инженера адаптироваться к изменяющимся условиям. Профессия инженера-строителя сохраняет высокое значение и в новом тысячелетии. От строителей зависит, насколько комфортной будет жизнь людей. Это благородная профессия.

Ключевые слова: профессия инженера, строительство, общекультурные компетенции, общетехнические компетенции, узкопрофессиональные компетенции, знания, навыки, умения

THE PROFESSION OF CIVIL ENGINEERING IN THE 21ST CENTURY

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The rapid development of technology and breakthrough scientific achievements contribute to the changing labor market. To be successful in the XXI century we will need new both professional and personal qualities. Students study 4–6 years to receive the civil engineer's profession. But it isn't enough. New construction materials and machines appear, environment conditions change, and engineers should adapt to the new situation. They have to meet technological challenges and satisfy the demands of the customer and consumers. Civil engineering is an important profession. These specialists make our world civilized, improve our life. Civil engineers are responsible for durability of buildings and constructions, so they are responsible for life and human health. Engineers with architects do our world beautiful. So, it is a noble profession.

Keywords: civil engineering, hard skills, soft skills, construction, general cultural competences, general technical competences, professional competences, knowledge, skills, abilities

A builder is one of the oldest professions. It appeared many years ago, when people left the cave and began to build their own habitation. Slaves were the first people who were engaged in construction. But, despite the fact that this profession appeared several millennia ago, it is still one of the most popular.

Construction is not only design and building – it is exploitation, assessment of land usage efficiency, economic and legal problems. The modern building complex requires competent specialists who are able to set and independently incorporate complex, non-standard engineering and design tasks.

“Civil engineering is everything you see that's been built around us. It's about roads and railways, schools, offices, hospitals, water and power supply and much more. The kinds of things we take for granted but would find life very hard to live without”. [3] Civil engineers deal with the following areas:

- Highways
- Water supply and water disposal
- City construction
- Industrial and civil engineering
- Hydrotechnical construction
- Production of construction materials

- Examination and management of real estate

- Combustible gas supply and ventilation

Probably the civil engineer is the second person after the architect-designer who knows all about the project of building. “Until modern times there was no clear distinction between civil engineering and architecture, and the term engineer and architect were mainly geographical variations referring to the same occupation, and often used interchangeably”. [4].

The types of professional activity of civil engineers are:

- building and reconstruction of industrial and civil buildings and structures
- preparation of project, design, budget and technical documentation
- maintenance of industrial and civil buildings and structures
- technological, information, legal and economic problems of construction.

The experts who are able to put and independently realize various tasks, both in the design and in the field of direct building and maintenance of construction objects. The civil engineer has to know: descriptive geometry and drawing; material strength; construction

mechanics; theoretical mechanics; bases of electrical equipment and electronics; automatic equipment; geology; hydraulics; heat engineering; technology of construction production; methods of calculation, design and quality control of building constructions; bases of budget estimation in construction and its financing; the principles of equipment of buildings water systems – and gas supply, power supply and communication, the sewerage and rubbish disposal; economy of industrial branches and enterprises.

The engineer has to know construction norms and rules (Construction Norms and Regulations), the budget project documentation, state standard specifications. Also engineer has to have skills of technical drawing and reading blueprints, has to be able to work with special Autocad, Grandmeta programs. Many employers pay attention to knowledge of technical English as a necessary condition to hire a specialist.

The civil engineer should be able to: solve the tasks of building industrial and civil buildings and structures, supervise the general construction works, the installation of building structures, inspect the condition of buildings and structures, develop projects for the organization of construction and production of works, carry out architectural supervision over the construction of buildings and structures.

“Civil Engineers are creative people who solve problems. They come up with lots of ideas and then turn them into real things for people around the world to use”. [1: 5]. Professionally important qualities for civil engineers are:

- developed abstract thinking;
- analytical mind;
- large amount of long-term and operational memory;
- high level of development of spatial thinking;
- emotional stability;
- high noise immunity.

This profession demands a lot of diligence and devotion. To become successful it is necessary to love and respect the work. Being fond of work you achieve good results, you will become more self-assured and you will make a big contribution to the development of the country. It belongs not only to the civil engineer's profession. It is important to find a job what you really like and every morning go to your work with pleasure. Desire is the progress engine and no money will help there.

Time flies, and employers make new demands.

The rapid development of technology and breakthrough scientific achievements contrib-

ute to the changing labor market. To be successful in the XXI century we will need new both professional and personal qualities.

Today, the demands for the training of construction specialists range from building knowledge to marketing and economic knowledge. These are so-called hard skills (skills that can be visually demonstrated). First of all, they include a high-quality higher education. Many experts note a decrease in the level and depth of academic knowledge among graduates, which requires additional investments from the company. The company has to train half-educated people at their own expense, which is economically unprofitable. This also includes knowledge (or additional education) in the field of economics and business. Civil engineers have to understand economic and legal aspects of the activity for today. It will allow graduates to enter a personnel pool of the company and within the first 5–8 years of work to build up their management career.

But it isn't enough. The competent experts possessing soft skills are required for a modern construction complex. These are communicative and presentational skills, ability to work in a team and pro-activity i.e. ability to optimize processes in one's own work. The format of «interactive», for example, participation in an interuniversity business games best of all is suitable for their formation.

First of all engineering specialties will be demanded in many industrial and construction companies. At the same time, the engineers have to be experts «from capital letter». Engineers of the 21 century are engineers who contribute to the development of production, use of the best practices, ensure effective functioning of the enterprise.

To describe competences of a worker of 2020, it is necessary to understand approximately how a situation in the country, in the region and in our city will have been developed by that time. In crisis and post-crisis times the companies should work in the conditions of austerity, increase in production efficiency, decrease product cost. First, the employer will be more and more aimed at efficiency of each specific worker; will wait from him for the maximum return not only in respect of physical work, but also in respect of approach to work. Secondly, vacancies won't become any more numerous. There will be a competition for jobs in all the stable, socially oriented companies. In this contest not only the most professional but also most flexible applicants will be able to win, to work in conditions of continuous changes.

Considering these and some other tendencies, it is possible to call qualities which have to be inherent in the worker of 2020: high engineering qualification, flexibility in the situation of continuous changes, adaptability, involvement in the process of continuous improvements, and readiness for self-development.

Any expert has to be the professional of the business and aspire to it. The engineer has to be easily trained and above all has to develop and improve the skills. Separately it is necessary to tell about emotional intelligence, it increases survival in the environment, helps to adapt with the current market situation and to find a common language with team.

The rapidly changing world poses all the new demands for those who want to take place in the profession. One of them is the need to constantly replenish one's knowledge. If a young person leaves the university and believes that his training is over at this point, he has obviously lost. And, constantly developing, it is necessary to be able to find growth points in their professional activities – this is the task of the person himself, and not someone else. If one wants to be on demand, one has to be one step ahead.

Students study 4–6 years to receive the civil engineer's profession. But it isn't enough. New construction materials and machines appear, environment conditions change, and engineers should adapt to the new situation. They have to meet technological challenges and satisfy the demands of the customer and consumers. Customer is a person who does the order to the engineer. Consumers are people who will live in buildings which were designed by the engineer.

Civil engineering is an important profession. These specialists make our world civilized, improve our life. Civil engineers are responsible for durability of buildings and constructions, so they are responsible for life and human health. Engineers with architects do our world beautiful. So, it is a noble profession. "Civil Engineering is truly the profession that has shaped our past and is helping define and build our future" [2: 10].

Several buildings of the world with an unusual architecture:

1) An unusual house in Poland is completely devoid of right angles. It was created in 2004 by the architects Zalewski and Shotinsky. The architects were inspired to create such a bold construction by drawings of children's books by Per Oscar Dahlberg and Jan Marcin Santser. Despite the bizarre appearance, the curve of the house is incredibly functional and rightly considered one of the city's main attractions. Near this truly extraordinary structure, life and movement are constantly boiling. On the first floor of a quaint house there are cozy cafes and shops. And on the second one there is the estate of radio stations. If you visit Poland – be sure to take a picture against the backdrop of this futuristic structure.

2) Forest spiral, Darmstadt – The architect who designed this 12-storey residential building in Germany, considered straight lines as a tool of the devil. Perhaps, that is why his creation is twisted around a courtyard, and a real forest grows on the roof of it.

3) It is not necessary to go far to see unusual houses. Our country is an inexhaustible resource of talented authors and their unusual buildings, and the wooden skyscraper of Nikolai Sutyagin is no exception. This Archangel miraculous house is the tallest wooden structure in the world. It was created by the technology of our ancestors – without the use of nails. From the building with a height of 13 floors, an amazing view of the White Sea opened. Yes, it was opened. The house was illegally built and was dismantled to 4 floors in 2008, and in 2012 the building burned down completely. From the first wooden skyscraper in the world there was only a foundation.

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