отдачей каждый из студентов получил уникальную возможность знакомства с новой для них тематикой, нормами отношений в профессиональной среде, повышения эрудиции, погружения в культурный контекст значимого исторического места, осознанного выстраивания межличностных связей в коллективе. Для казанской архитектурной школы подобное «встраивание» ее учеников – подтверждение должного уровня профессиональной подготовки каждого этапа обучения.

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The construction of modern skyscrapers of the XXI century

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Abstract

The article traces the history of the development of skyscraper construction technologies. The growth rate of the tallest buildings in the world is determined. It was highlighted that Moscow is the leader in high-rise construction. This is facilitated by the availability of financial and material resources of the capital. When constructing skyscrapers, self-lifting formwork is used, moving upwards as construction progresses. Self-climbing is often used. It is revealed why, during the design and construction of skyscrapers, much attention is paid to elevators. Different shapes of skyscrapers are considered.

Keywords: skyscraper, horizontal passages, development of construction technologies, weight of the structure, high-rise construction, continuous panoramic glazing, elevator, metal foam

Purpose of the article is to trace the history of the development of skyscraper construction technologies.

Today, high-rise buildings have become an integral part of urban development. The presence of skyscrapers distinguishes any modern city, and the ability to build them speaks of the high development of construction technologies, the intellectual capabilities of designers, and the readiness of an appropriate material and technical base.

The first high-rise buildings appeared only about 130 years ago. The very first skyscraper was built in the USA. The Home Intelligence Building in Chicago, USA, cannot be considered a high-rise building, but despite this, it is considered the first skyscraper in the world. In 1885, at the time of completion, it had 10 floors, and by the time it was demolished in 1931, it was already twelve. The Home Insurance building, designed by William Lebaron Jenny (USA), was the first among wireframes. Due to this, the weight of the structure was transferred to the ground not by bearing walls, but by an internal frame that supports it.

The growth rate of the tallest buildings in the world in the 21st century continues to accelerate. Over the past 4 years, more than half of the tallest buildings in the world have been built, and the total number of ultra-tall buildings has nearly tripled over the past 7 years. In recent years, Asia and the Middle East have held leadership in building skyscrapers.

The 828-meter Burj Khalifa ("Khalifa Tower") in Dubai, UAE, (picture 1) which is more than 300 meters above the building that set the previous world record for height - Taipei 101 (509 meters) in Taiwan. These skyscrapers will have a lower height compared to the Royal Tower, which will be the first building in the world with a height whiter than 1 kilometer.

Picture 1 "Khalifa Tower"

By 2020, the average height of the 20 tallest buildings in the world will approach 600 meters, which is equal to the two heights of the Eiffel Tower.

In Russia, the leader in high-rise construction is Moscow. This is facilitated by the availability of financial and material resources of the capital.

Maximum height: 338.8 meters (Mercury City Tower) (picture 2). The tower has 75 ground and 5 underground floors. It has a golden color and an unusual architectural solution. It was the tallest building in Europe until September 25, 2014. In this skyscraper all innovative technical solutions are applied, such as continuous panoramic glazing with the use of energy-saving, high-strength, tinted double-glazed windows; four pipe air conditioning system; central heating system of reliability category I uninterrupted power supply system of reliability category I; a unified automated building management system corresponding to the concept of an "intelligent building", an integrated security system that is linked by a single management program; fire warning and evacuation control system, automatic fire alarm system with a full range of fire protection, 26 modern high-speed elevators, the waiting time of which is less than 30 seconds.

Picture 2 «Mercury City Tower»

When erecting skyscrapers, self-lifting formwork is used, moving upwards as construction progresses. Self-climbing is often used.

Workers go upstairs on a passenger-and-freight lift with a capacity of up to 20 people. In high-rise construction, mainly materials such as steel and concrete are used. The rigidity of the “skeleton” of the building helps to withstand wind loads, and flexibility - to resist seismic vibrations. The facades of skyscrapers are mainly steel profiles and lightweight hinged panels made of transparent glass, aluminum, and polymers. Among the newest types of cladding are ceramics with borosilicate glass (which instead of alkali contains boron oxide, which makes the glass resistant to fire), panels made of metal foam, glass panels with a water-repellent self-cleaning layer.

Much attention is paid to elevators due to the fact that with their help people can quickly go down and get protected in a fire or earthquake. Specialists in Europe and the USA are convinced that elevators are the best means of evacuation. Lifts and their shafts must be safe from flames and smoke. It is also necessary to replace the cable hoist, which depends on electricity; should exclude the fall of the elevator; An elevator must accommodate hundreds of people. The recommendations listed do not correspond to any elevator in the world. Floating elevators are the most promising area as a means of rescue.

A significant advantage of high-rise buildings is their high economic performance and performance. The construction of skyscrapers borders on the cost of erecting ordinary multi-story buildings, in view of the fact that the main capital falls on the purchase of land and preparation of the site for construction (picture 3).

Picture 3. «Taipei 101 (509 meters) in Taiwan» The number of floors of the skyscraper is 101 floors, the height is 509.2 m, together with the spire. On the lower floors are shopping centers, on the upper are offices

The shortcomings of high-rise construction are combined with the problems of transport and urban development. With the existing sufficiently high building density, a transport crisis arises in the center of the high-rise structure.

The shortcoming of high-rise construction, experts call the high probability of risk. The reasons for emergencies and accidents may be the desire of the customer to save on foundations. During the construction of high-rise buildings, the volumes and quality of engineering and geological surveys should be increased before construction begins.

Doctors protest against high-rise housing, who say that a person's continued presence at the 16th floor level can induce suicidal tendencies. Another complication for tall buildings is the wind. Due to the high heights and in the space of the facades, the speed of the wind flowing around the building increases with height, and massive air turbulences can create vibrations. But, with regard to research by German scientists, the wind can have a beneficial effect - it serves as a guarantee of drawing out smoke in a fire.

Wind pressure directly depends on the shape of the skyscraper. Preferred is round: air flows around without creating turbulence. Second place is the shape of a drop, oval, triangle (picture 4) with rounded corners (picture 5). In third place is a rhombus (picture 6), a square.

Picture 4 «Triangular skyscraper in Paris»

Picture 5 «Circular Skyscraper in Abu Dhabi»

Picture 6 «Rhomboid skyscraper in Barcelona»

So, as we see, at present, the pace of construction of skyscrapers will only increase in urban development. This is facilitated by the rise in price of urban land in large cities of the world and the improvement of the material and technical base, building materials, programming of building design using calculation programs. The population seeks to live in large cities with urban centers, which also provokes the demand for high-rises.

The next stage in the development of the operation of skyscrapers is predicted - their universal connection with each other using overhead transitions at different altitude levels according to the transition of the Petronas twin towers in the center of the capital of Malaysia, Kuala-Lumpur. The introduction of horizontal transitions can solve a whole range of negative factors of skyscrapers. For example, evacuation in case of fire is not down, but to the side, into the transition of the neighboring building.

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Vitruvius. From the Renaissance to the end of the 18th century

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Abstract

This article provides a brief overview of the works of the Great Architect. His contribution to the development of human existence is appreciated. The article notes that Vitruvius studied works in construction and engineering, including military equipment. Vitruvius saw six categories at the heart of the aesthetic component of architecture. The work of an engineer is considered, in which the author systematized all the information known to him at that time, generalized the practical experience accumulated by predecessors and contemporaries.

Keywords: aesthetic component of architecture, architect, aesthetics of architecture, ancient architect, symmetry, recommendations, harmonious architecture

The topic of the article is VITRUVIUS. From the Renaissance to the end of the 18th century.

The main goal is to give a brief overview of the works by the Great architect.

The task of our work is to collect information about the activities of the architect from various sources.

Among those who contributed to the development of human existence is the Roman engineer Vitruvius - the most famous ancient architect who lived in the second half of the 1st century BC. Vitruvius, also known as Marcus Vitruvius Pollio, was born in the Campaign in a family of architects, thanks to which he received a comprehensive education.

The Roman engineer knew Greek, which allowed him to study works in construction and engineering, including military equipment. Under Caesar and later under Augustus, he leads the creation of military vehicles.

Basically, little is known about vitruvia as a person, but his works are the source of most of the biographical information. they will be able to tell us about the mysterious personality of an engineer through millennia.