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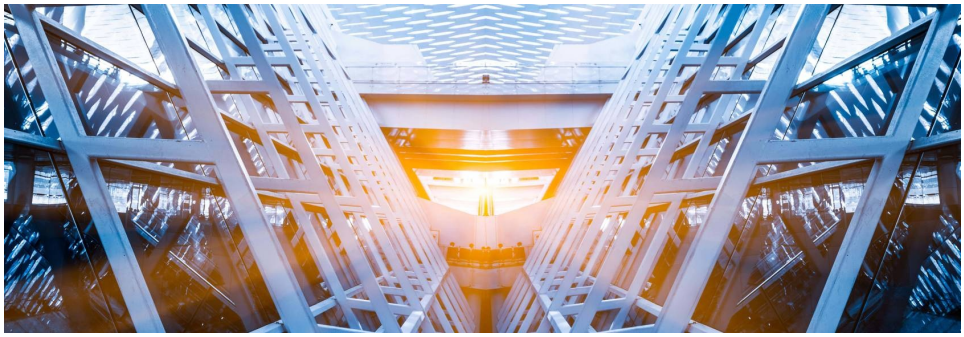
How to save on shopping mall construction with steel frame technology

Steel frame buildings have long been the classics of world architecture. Steel structures can create unimaginable shapes.



.Such architecture evokes emotional responses, which are known to be a driver of sales. The aesthetics and the spectacular concepts of steel design bolster the financial calculations. We discuss how a developer can save on the

construction

of a shopping mall without compromising quality.

Speed of construction

Steel frames are on average 5-10% more expensive than concrete structures. However, this cost difference can be compensated through the speed of construction. Steel frame technologies can help to commission a building 4-6 months earlier than a building made of reinforced concrete. In Ukraine, for example, this means saving several million hryvnias a month.

Proper design and the predictable behaviour of metal during construction can help to open a shopping mall right when the season starts. If we include here additional cash flow due to early commissioning, the cost of a facility

built from structural steel

will be lower than that of one built from reinforced concrete.

According to the estimations of the Ukrainian Steel Construction Centre, a steel frame shopping centre with a total area of 73 thousand square meters will cost UAH57.2 million, whereas a centre made from reinforced concrete will cost UAH68.6 million. The difference of UAH11.4 million is significant.

Light weight of steel frame

Steel solutions are 30-40% lighter than those made from reinforced concrete. This has a significant impact on the cost of pile foundations, especially where soil quality is low. The groundwork stage alone can help to save up to 45% on the cost of labour due to lower foundation loads, fewer piles and less earthwork.

The construction of a reinforced concrete frame also involves many wet operations and can be affected by the human factor. The developer must continuously monitor what is going on at the construction site to make sure that the concrete is being poured properly.

Steel structures used for construction are prefabricated, so they can be assembled on site like Lego. This minimizes the dirty work and makes the construction process convenient.

Column-free

The main goal of any shopping centre is to take as much advantage as possible from each square meter. The leasable space can be increased due to flexible layouts and multi-meter spans, with the columns located only along the perimeter of the building so that they do not affect the overall view. A reinforced concrete structure is limited by column spacing of 8.4 m by 8.4 m, which reduces efficiency for the retailer. The columns often block the view of shop windows and architects have to find solutions to make them fit the interior, which entails extra costs. The convenience of the layout provided by a steel frame allows the owner of the shopping centre to make more money.

Proper architectural and planning solutions will help to reduce steel consumption in the frame. For instance, a horizontal layout will provide 10-30% savings while helping to create long spans and avoid extra columns. The use of cellular solutions can help to not only save up to 20% of steel but also install the entire engineering network inside the beams of metal flooring.

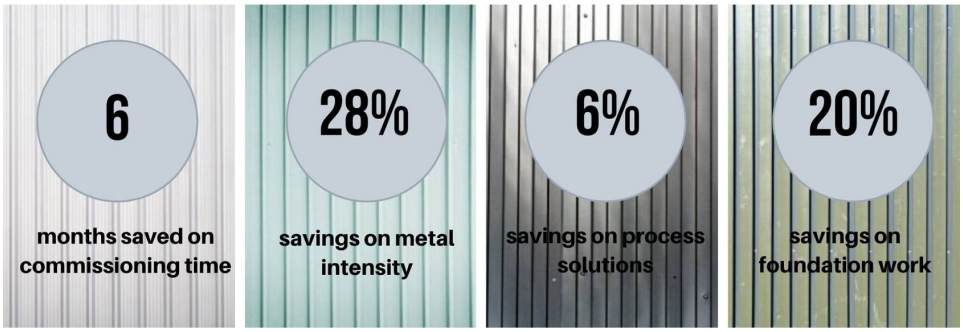
Highly adaptive

The life of a shopping centre in its original form is limited to ten years, after which the concept of the facility must be changed completely. During this time, tenants of the shopping centre are constantly changing. The biggest challenge is the replacement of anchor tenants, for example, of a supermarket. In a steel framed building, it is much easier and faster to change the layout of a space to meet the requirements of a new tenant than in a monolithic reinforced concrete building.

Effective fire protection

Steel structures need fire protection. The use of various materials like plaster mixes and paint can reduce the cost of fire protection. For instance, mixes extend the service life of the fire-retardant coating, which can serve as long as the steel structure itself. Therefore, their use is cost effective for structures that must have high fire resistance.

It is also necessary to consider the conditions in which different elements will function. This will determine the amount of fire protection materials. Some expenses can be avoided with a careful approach to detail calculations. Even though some elements do not require fire protection, it is often included in the project, which significantly increases the budget.



According to the estimates of fire protection specialists, the optimal selection of flame retardants and the calculation of steel structure critical temperatures can save up to 40% of materials in the construction of a hypermarket or a logistics terminal, and up to 25% in the construction of transport infrastructure.

Image (attached). Construction of a shopping and entertainment centre with an area of 17.5 thousand square meters generated financial benefits of UAH90 million.

> «For an investor, I can guarantee two parameters: ROI and IRR. The return on investment does not depend on time, it is the amount of money the investor can get, while the internal rate of return does depend on time. The later I spend the investor's money, the earlier I can get it back, the better my IRR is and the more stable my business is», – Andrey Ryzhikov, CEO and managing partner of developer company DC Evolution.

While steel is a perfect material for a shopping mall, it is still quite a novelty for high-rise residential construction. The love of remodelling causes fear, however. In an office or a shopping centre, remodelling can be controlled, whereas it is extremely difficult to see what is happening in thousands of apartments. People can overheat a column or remove fire protection. What will other residents of the building have to do?

> «Steel is a choice of the brave who can overcome their fears. Steel for public places is a fear that any developer faces. Only economic calculations can dispel the fears», – Andrey Ryzhikov.