

Steel car parks: how to deal with urban car congestion

Cars are everywhere: on pedestrian paths, lawns and crosswalks. To crown it all, pedestrians have to manoeuvre between people on bicycles, scooters and various electric wheeled devices. Metinvest SMC, the sales network of Metinvest Group in Ukraine and the CIS, knows how to make city streets comfortable for drivers and pedestrians.



The company has launched a new service for the construction market, offering steel projects on a turnkey basis – from concept development to construction support by

[Metinvest SMC's Project Department](#)

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The company now offers a solution to address parking problems, namely a

[standard car park design](#)

that can be customised and organically integrated into any architectural environment.



Complete construction kit

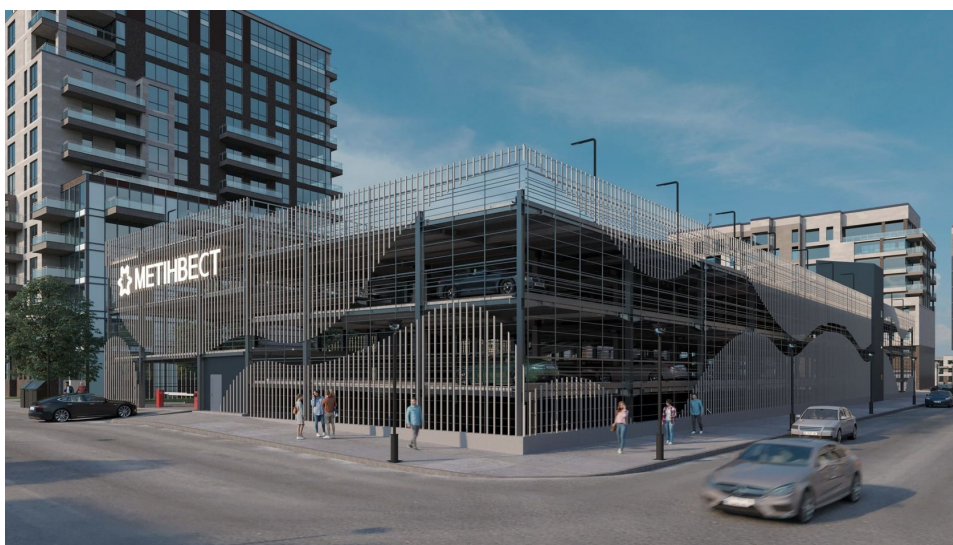
The car park design was developed by Druid Project Bureau using building information modelling (BIM) software. This technique makes it possible to find the most efficient solution for the customer using a digital twin of the building in three-dimensional space. The 3D model renders the car park true to form using the 'What You see Is What You Get' principle.

The standard design considers all components required for the proper operation of a car park. The building has a steel skeleton and consists of modules made from steel structures with utility lines, including heating, water drainage, ventilation, lighting and firefighting. The design also provides for an access control system: access gates, payment system, directional signage and video surveillance.



The modular concept makes it possible to use the standard design to either construct or reconstruct a car park. The design allows for modular assembly by thinking through each link and estimating its effect on the total project cost.

The customer can select from among 30 different two- to four-storey car park options with spaces for 107-457 cars. The car park height and length can be increased. The building length starts from 48 metres and each module extends it by 8 metres. The design is compliant with all Ukrainian standards for such structures, including those governing strength, reliability and stability, as well as architecture and fire safety.



Steel car park advantages

The architectural solution makes it possible to stagger the parking levels vertically by one half storey to reduce the ramp length and increase the number of parking spaces. The building arrangement accommodates 12% more cars than other existing car parks. The building footprint is used as efficiently as possible, considering the terrain and elevation differences of the construction site.

In addition, the issue of water drainage was solved at the design stage: floor slabs are installed at a slight incline, which also reduces the floor thickness and the load on the foundation. This makes the steel car parks at least half the weight of reinforced concrete ones.



The car park support structures include welded steel beams and columns made of plates, which reduces the building's metal intensity and construction costs. The design provides for reinforced concrete floor slabs with leave-in-place formwork using corrugated sheets.

The building layout maximises the amount of open space. Small columns are installed so that drivers have good visibility and can easily exit the parking spaces. Each floor accommodates two compact staircases that comply with fire safety requirements and serve as fire escapes. They have their own foundation and are clad with fire-retardant sandwich panels. Elevators may be installed next to the staircases where necessary. The design also follows barrier-free environment principles. This makes the car parks easy to use for people of any demographic. Chargers have also been provided for the convenience of electric vehicle owners.



The steel car park can easily fit into the surrounding environment. Metinvest SMC offers its customers several architectural design solutions for the building. The car park can be designed with a steel roof made of corrugated sheets or a walkable roof, as well as with various facades and in different colours.

Construction cost and time

It takes one or two months to adapt the standard design to a land plot, depending on the terrain. For example, if the customer's site is consistent with the standard design constraints, the expert review of design documentation can be carried out three weeks after the initial data have been submitted.



All that remains is to select the foundation based on the geological site conditions, develop the general layout and conduct the environmental impact assessment. All other engineering and documentation development stages are included in the project scope. It will take about half a year to build a covered four-storey car park for 217 cars and another half a month to erect each new module.

The customer will be able to monitor the construction time for the car park using a specially developed schedule showing the sequence of construction and assembly work, as well as permitting and approvals, based on the scope of work. The schedule helps to increase the overall efficiency of engineering and project management.

A steel-framed car park is a value-enhancing investment. It costs around US\$300 per square metre to build a steel car park on a turnkey basis. Metinvest SMC calculates the return on investment at up to 75% for a project, excluding the cost of the land plot, the internal rate of return at up to 12% and the payback period at one to five years, depending on the business model selected by the customer (sale or rent). The company can assist with car park investment model calculations for specific sites.

This ready-made solution offers a profitable business for the customer, who will receive a well-thought-through design at an optimal price. It will also complement the urban environment by bringing a sense of calm and safety for car owners and creating more comfortable conditions for pedestrians.

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