



Anna Merkulova, CEO, Mosproekt-3

Russian infrastructure construction moves into top gear with BIM – Q&A with Anna Merkulova, Mosproekt-3

In Moscow, the vast transport network upgrades undertaken in the last 11 years are close to completion. The road networks have been extended by over 1,000km along with significant expansions of the metro and suburban railway systems, which have been integrated with major transport hubs in the city center. Mosproekt-3, a leading Russian centre of engineering competencies, has been heavily involved in Moscow's core transport projects and is also currently implementing the new international Europe-Western China Route. Anna Merkulova, general director of Mosproekt-3, talks about the distinctive features of infrastructure construction in the densely built-up megapolis landscape that is Moscow.

What are the aims for Moscow's transport reform and what results have been achieved so far?

The emphasis of infrastructure construction has been on the extension of the off-street rail transport network, primarily the metro system, which is clearly the most popular means of transport in Moscow. Passenger railway networks have been extensively upgraded, as seen with the Moscow Central Circle, and enhanced with new city train services via the new Moscow Central Diameters.

In parallel, road construction has seen substantial investment. Compared with other megapolises, Moscow has a shortage of road networks, especially when considering the steady growth of vehicles, which is today as high as nine million. In response, over 18% of the current road network in Moscow has been built in the past 11 years.

Several large-scale projects in Moscow's road construction programme have been implemented effectively. Firstly, there have been efficient efforts

to reconstruct the crucial outbound highways that take traffic beyond the city and connect the centre of the city with the surrounding areas. The construction of overpasses alongside roadway extensions has delivered separate lanes for public transport and routes free of traffic lights for vehicles. A total of 14 highways have been reconstructed and – for the first time in over 25 years – a new highway that provides two additional routes.

In tandem, the majority of the radial highway interchanges serving the Moscow Ring Road have been upgraded and modernised. Historically, as the city grew it 'took over' the Moscow Ring Road, which was initially supposed to serve only as a bypass. However, its capacity to handle the increasing levels of traffic eventually ceased. Nearly all of the interchanges that have been renewed were of the cloverleaf type, but these have been provided with directional downward ramps, drives and acceleration lanes. As a result, 18 transport interchanges on the Moscow Ring Road are now functioning smoothly with an increased carrying capacity, and four more are being reconstructed.

One of the major road infrastructure projects in the city is the Chord system of Moscow, the network of highways under construction between the Third Ring Road and the Moscow Ring Road. It is formed by four separate chords and bypasses: the North-Eastern, North-Western and South-Eastern chords, as well as the Southern Rode. The chords are designed to enable high-speed cross-linked connections in the middle of the megapolis. The North-Western chord is now open to traffic and the final sections of North-Eastern chord and Southern lateral road are being completed. The works on the South-Eastern chord are well under way, and the full Chord system is scheduled to be completed in 2023.

Apart from the above, we have also achieved significant results with the Greater Moscow project, the new area being redeveloped to the south-west of the city. It is a similar project to the Grand Paris project in Europe, where Paris and its suburbs were united through new transport networks. In New Moscow, the key roads now link with the historic centre have



North-East Expressway construction

been renovated and large-scale, cross-linked connections have been established. In addition, a unique overground metro line consolidated with the highway has been installed. At present, we continue to form the transport consolidation structure between the local road network and metro.

What are the challenges of construction in Moscow, and what technological solutions are applied?

Moscow is the largest and most economically active megapolis in Eastern Europe. The rhythm of the capital of Russia tends to impose severe constraints on the principles of infrastructure construction implementation. The methods of lifting and launching are widely applied to minimise the effect on traffic and passenger transport services. In the last 11 years, over 300 massive engineering structures, including 16 bridges, have emerged.

While designing and engineering transport sites, the team of the Group of Companies Mosproekt-3 applies BIM extensively. For instance, for the 10km-long Northern Drive of Kutuzovsky Prospekt, we created a topographic scale-model of the site that covered 320ha of urban area within the landscape and the entire utility distribution system.

The complexity of the site was caused by the presence of numerous

intersections and junctions together with the existing road network, railway, metro, engineering utility lines and the Moskva River. We were awarded the status of BIM-leader in infrastructure construction in Russia for this project. Today, the state is oriented toward the prospects of information modelling technologies and, as a result, BIM is becoming a mandatory tool for government contracts.

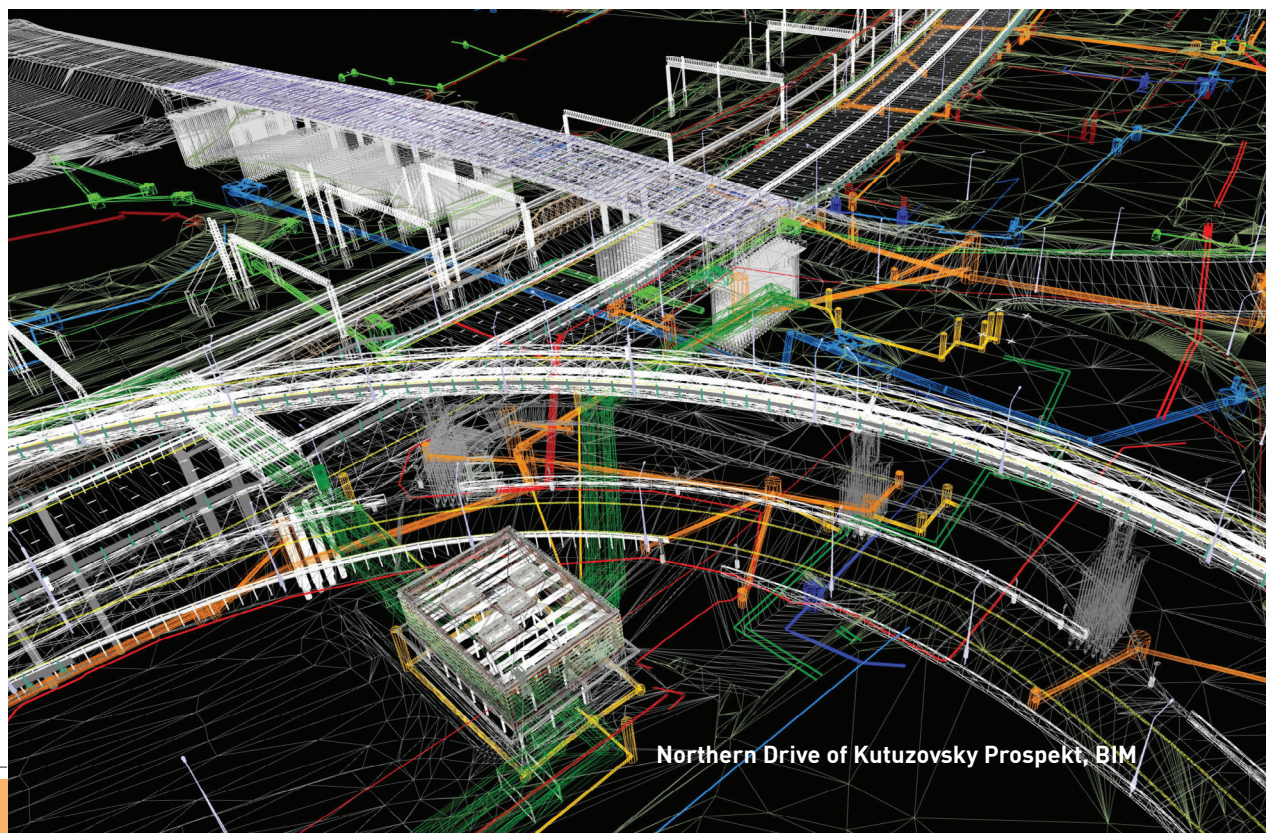
What are the large-scale projects you are working on at the moment? And what is next?

The leading project for the Group of Companies Mosproekt-3 remains the international route Europe-Western China. We are releasing a few sections of the highway in the territory of Russia, in which seven bridges will be deployed. One of them is of a particular interest to the professional community, since it lies in an area with challenging geological conditions and active karst processes.

Our engineers carried out a huge amount of research into the issues, involving the analysis of historical data, hydrogeological exploration, digital aerial photography survey, and the study of satellite images by means of interferometric methods, amongst others. The computer analysis of the data made it possible to define how active the karst processes were.

Thus, on the basis of the information obtained, the team also managed to create a mathematical model of risk of new phenomena emergence. The engineering-geological model is absolutely unique among Russian infrastructure projects.

As assigned by the President of Russia, Vladimir Putin, the route is set to be extended into a few megapolises of the country. The Government of Russia expects a widespread macroeconomic effect from the project.



Northern Drive of Kutuzovsky Prospekt, BIM