

CASE STUDY

Nagpur Metro Rail

5D BIM & ERP - Digital Project Management for Nagpur Metro in India

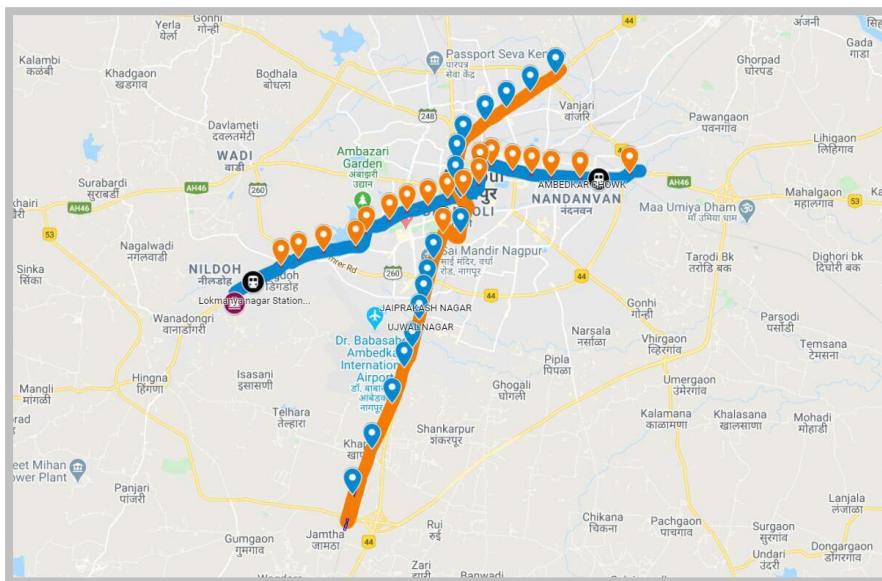
**iTWO is the core solution of MTWO Cloud*



About Nagpur Metro Rail

Nagpur city is the winter capital of the state of Maharashtra, India, with a population of 46,53,570. The city boasts of being the geographical center of the nation. Nagpur is also a major commercial and political center of the Vidarbha region of Maharashtra. Nagpur Metro Rail (<http://www.metrorailnagpur.com/>) Project will consist of 38.215 Km metro corridor, 38 stations and 2 Depots. The entire stretch will be divided into 2 alignments or corridors as follows:

Alignment	Corridor	Rail Length	No of Stations
1	North - South Corridor	19.658 Km	18
2	East - West Corridor	18.557 Km	20



“We chose iTWO because we found that it was giving us a very effective solution to our problems. iTWO implementation has gone very well so far, we have adopted 5D building information modeling based digital project management platform for the first time in India as far as large infrastructure project scope.”

Dr. Brijesh Dixit, Managing Director
Maharashtra Metro Rail Corporation Limited

The challenge

The Nagpur Metro Rail project is a fairly complex one, with more than 20 major contractors working over a period of time for this project and around 30 subsystems including signaling system, telecom system, rolling stock, air conditioning, electrical, etc. thus a large amount of coordination is required for these systems to run together and a platform which has BIM management along with an integration software was best suited for the project's requirement.

In order to have a better project information, to reduce cost overrun and time overrun, Nagpur Metro Rail Corporation Limited (NMRCL) decided right from the beginning that they would go for a digital project management for the complete project. In addition to this, the concept of asset management was planned right from the beginning so that all the construction details which the project develops will all be available for future maintenance of the metro system.

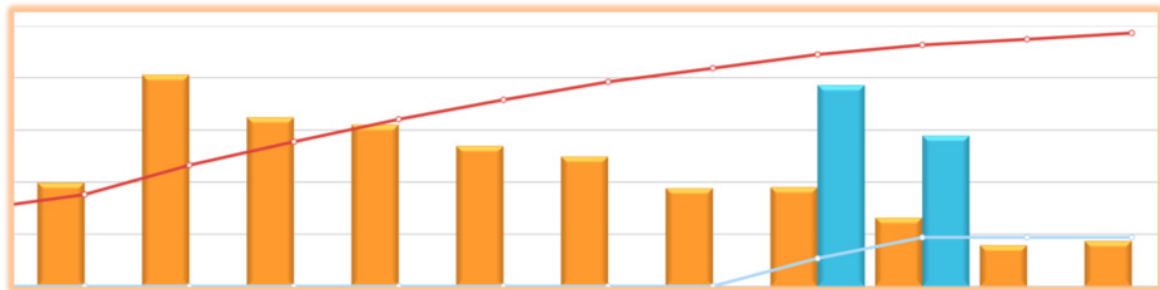
The solution

According to its unique requirements, NMRCL selected a few major digital project management systems including iTWO for efficient management of the project.

Integrating 3D model with quantities and costs in iTWO

By using 3D model in iTWO, YIT detects clashes and checks the quality of their 3D models. Besides that, it's mainly used for quantity estimation.

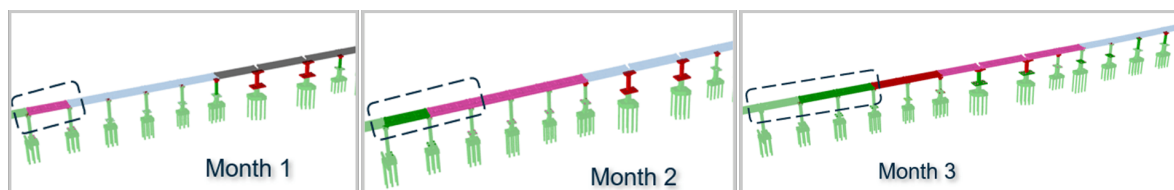
- Utilization of 3D model in cost optimization
- Change order management
- Earned value management through controlling structure
- Integrating schedule and actual cost information to analyze physical progress and financial progress



(Month wise Planned Vs Actual Cost Comparison in iTWO for better Controlling of the project)

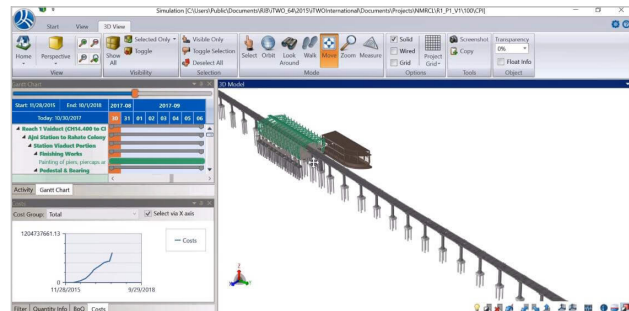
Model based delay analysis

As the data entered was analyzed on a weekly and quarterly basis, NMRCL had model-based delay analysis, for example (below pictures), the progress of the project is showed in different colors: work completed in previous reporting month, work in progress in current reporting month, work planned in next reporting month, and delayed works in current reporting month. This way, a complete picture is always available for the management, allowing for efficient decision making.



Achieving 5D BIM integration through iTWO

- Provided integrated view of project by linking 3D model, schedule, cost
- Timely rectification of the flaws in construction sequencing by contractor in schedule with the help of simulation
- Model based progress monitoring during execution
- Single platform for 3D model, scheduling (4D) and cost (5D)



The result

Nagpur metro is considered to be a benchmark for future mega infrastructure projects in India and the key success factors are:

- Collaborative & user-friendly working environment
- 3D model-based analysis from concept till commissioning
- Design-Drawing & Document Management System
- Effective project controlling & monitoring system
- Complete cost accounting system
- Asset information management system
- "Knowledgebase" for future metro projects in India

"iTWO along with the other components of the digital project management platform has enabled us to undertake activities in a faster way, saving almost about 20% to 25% of the time, saving us cost, our project has been able to save almost about 10% of the cost so far. And we have been able to do all this, ensuring the high-quality standards and also high safety standards, in a manner that our complete lifecycle of the project becomes cost-efficient."

Dr. Brijesh Dixit, Managing Director
Maharashtra Metro Rail Corporation Limited