



# A Metro station in Pune delivered using Constructible BIM



*“With the Government of India mandating BIM for all important projects constructed in the country, and considering the complexities of the structure, we could only trust Tekla, which provided us with super accurate, as-built, constructible models. Since the project was already under construction, we had to simultaneously work on the 3D modelling and completing the structural fabrication drawings. Tekla Structures helped us reduce the time as we could extract the fabrication drawings directly from the 3D BIM models created for BIM approvals.”*

**- Mr. Akansh Kashyap, Business Development Manager, Telge Projects**



## Solutions

► Tekla Structures

# Overview

Telge Projects Pvt. Ltd. is an ISO (TUV-SUD) 9001-2015 certified structural engineering services & solutions company headquartered at Pune, Maharashtra, India.



LOCATION:Pune, India



**Telge Projects** is a structural engineering company that offers civil & structural engineering & detailing services to the Architecture, Engineering and Construction (AEC) industry, in the domestic and international market. They focus on leveraging the latest & best in BIM technology to deliver their structural detailing services to building contractors, structural consultants, fabricators, & manufacturers across Steel, Concrete and MEP verticals.

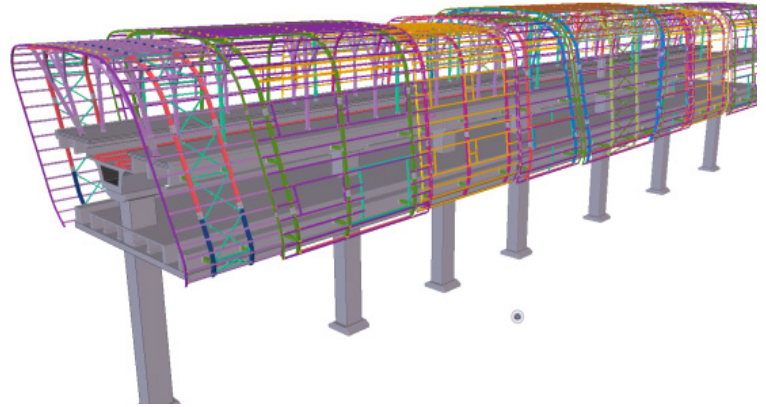


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## + An extraordinary structural concept +

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Telge Projects won the mandate of engineering the steel structure of the Mangalwar Peth Metro Station - one of the seven elevated stations on the Pune Metro - Vanaz to Ramwadi line. With a very unique idea of giving iconic looks to the stations on this Pune Metro line, the structures were designed to pay homage to the cultural heritage of the city. While the roof structure was designed with this inspiration, the internal sides had to be covered with an architectural sheet. The curves in the 180 meters long and 500 - 600 steel tonnage structure made the job at hand highly ambitious and challenging. Additionally, Telge Projects was also awarded with the task of delivering the Pune & Bund Garden metro stations.



Overall project layout of 140m

*"We received this project during the COVID-19 induced lockdown! It is only because of Tekla Model Sharing that we could continue working as efficiently as we had been working from our office. Executing such an extensive & challenging project on any other software than Tekla would have demanded seven to eight engineers and more than two months of work. On the contrary, this cloud-based collaboration tool enabled us to deliver the project with only two engineers, that too within a month. By reducing the cost of the number of engineers employed and the overall project time by 50%, we were able to save a huge amount of the budget without any effect on the quality of the output."*

- Mr. Vrajesh Lad, Team Leader, Telge Projects

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## + A challenging project delivered amidst the global pandemic lockdown +

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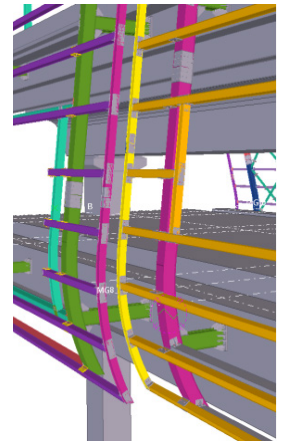
From the very beginning, this ambitious project came with numerous structural, design-based and execution challenges. The highly complex design, executing the project amidst a global pandemic lockdown, were amongst the foremost and most significant challenges.

### ► Design inspired by an iconic, local cultural element:

It was a daunting task for the design team to accurately imitate an iconic design for this project. This complex design necessitated precise and detailed execution with absolutely no scope of error and rework, given the extremely tight deadlines.

### ► Developing the blueprint of success, from one to many:

This project was the first of three similarly planned Metro station projects and its success was critical for the subsequent ones to follow. It was expected that if this design would excel and deliver on all the different parameters then the same design would be replicated in the subsequent projects. Such high stakes involved in the project raised the bar for delivery of a superlative infrastructural quality, a top priority for all its stakeholders.



Curved end purlin

### ► Hitting the ground running:

At the time the Telge Projects Team joined this project, it was already under construction and other teams had started working. This meant that the Telge Team had to match and adjust their timelines with other stakeholders. Working in tandem with other teams that already had a head-start on the project, added a whole other challenge to this project.

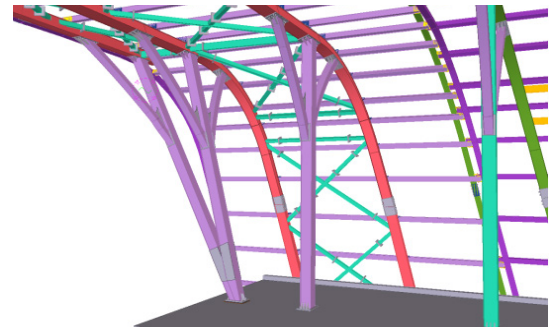
### ► Working remotely amidst a global pandemic:

Apart from the technicalities, the most unique challenge faced by Telge Projects was the execution of this assignment amidst an unprecedented, global pandemic lockdown. This was the first hands-on experience for the Telge Team to work in the new normal. With no prior preparedness, Telge Projects had to remotely deliver this project with the limited resources available and within a very strict timeline.

## ++++ + Tekla - the reliable BIM solution to deliver any design marvel + ++++

### ► Visualization & change management made easy:

3D visualization of the unique structure with the flexibility of automated change management was one of the most beneficial features of Tekla. It enabled Telge Projects to create the dummy elements of other materials for referencing and visualization. Using the visualization tools of Tekla Structures, engineers could evaluate the constructability of the curved members from the detailing point of view. Likewise, the modelling process of these members was very convenient and it ensured the desired quality of output required for the fabrication drawings.



*End column connection detail*

### ► Ease of drawing extraction:

The project under discussion was already in the construction phase and the stages required modelling and extraction of fabrication drawings and getting these drawings approved from the authorities. With Tekla, extraction of fabrication drawings was very easy. The drawings could be extracted soon after the modelling was completed, partially or fully, in a single environment and these could be submitted immediately to the authorities for approval. This eliminated the requirement of separate BIM models for submissions and approvals and manual detailing from scratch, which ensured significant savings in time and labour requirement.

### ► Powerful and vast component library:

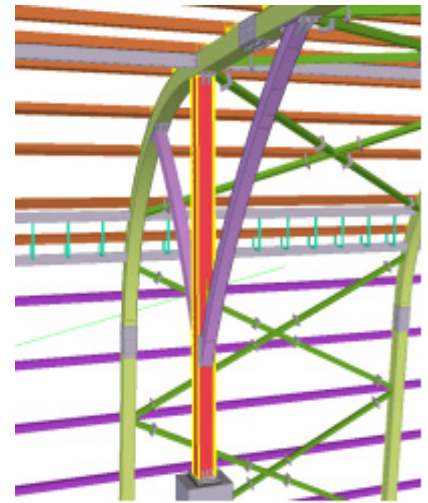
The modelling of inclined rafters curved in two directions and the curved tree-shaped columns could have been a major challenge from the point of view of detailing for the execution team. However, Tekla's powerful component library and versatile profile creating features helped the Telge Projects Team to mitigate these challenges. The availability of a vast connection library helped in successfully completing such a complex model.



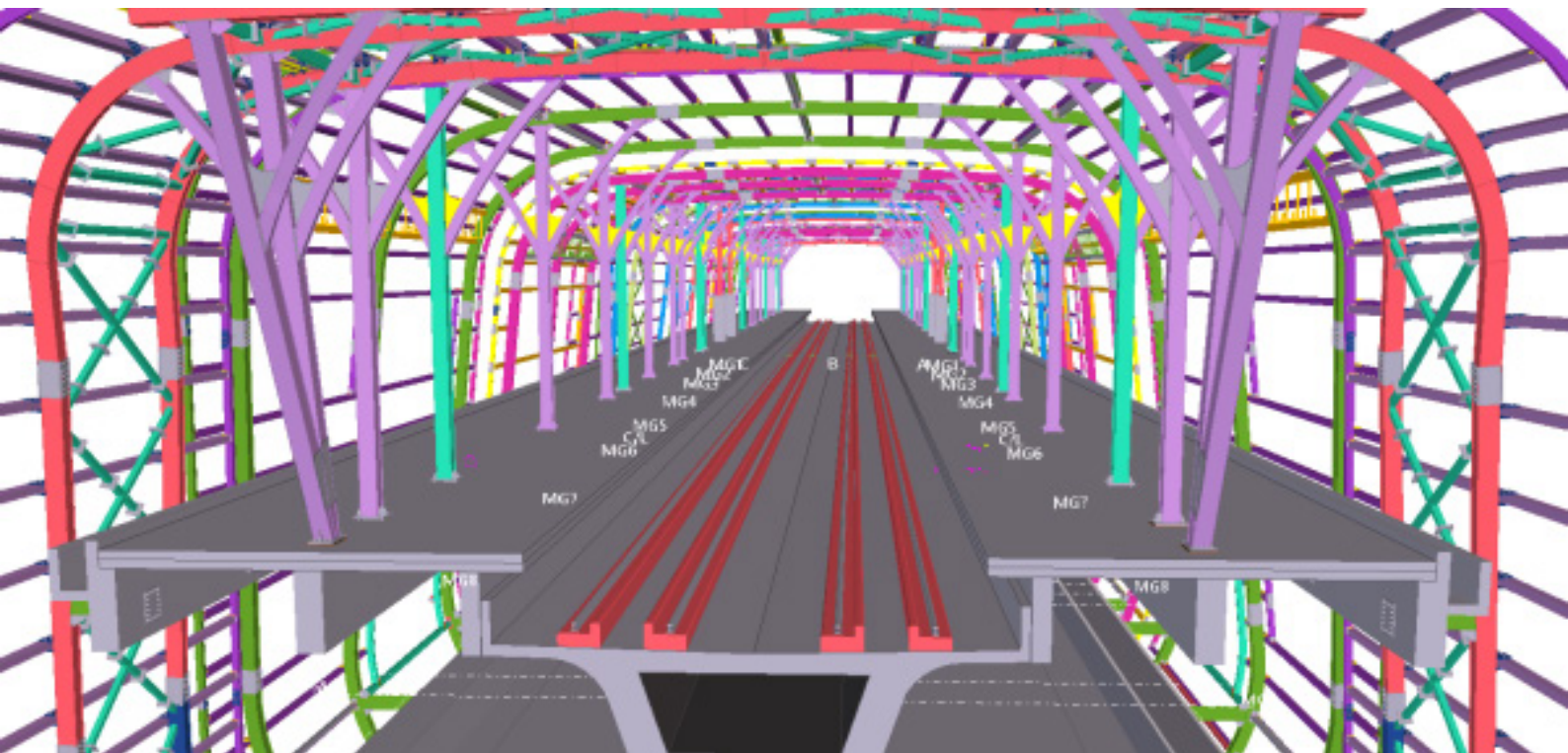
► **Tekla Model Sharing made remote working as good as being in the office**

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Apart from all of the above mentioned benefits provided to the project team by Tekla, it also contributed in a number of other ways. This amazing BIM solution with features like cloning drawing enabled faster creation of similar drawings in a tight timeline with lesser resources. It also greatly helped in clash detection and avoidance with its Clash Check tool.



*Column connection with curved rafter*



*Inside view of Metro station*

# Control throughout the structural workflow at your fingertips

Accurate, reliable information, as detailed as you need and always available, is necessary for a successful structural workflow. With Tekla software, your constructible design will promote error-free fabrication and successful construction. Welcome productive workflows and happy clients.

- ▶ **Tekla Structures** is the most developed Building Information Modeling software on the market. It makes accurate, constructible modeling of any structure possible.
- ▶ **Tekla Structural Designer** gives engineers the power to analyze and design buildings efficiently and profitably.
- ▶ **Tekla Tedds** is a powerful software to automate your repetitive structural calculations.
- ▶ **Tekla PowerFab** is a complete and connected steel fabrication management software suite.
- ▶ **Tekla Model Sharing** allows Tekla Structures project teams to work efficiently together regardless of their location or time zone.
- ▶ **Trimble Connect** is a cloud-based platform that connects the right people to the right constructible data.



**Trimble** is a technology company with a vision of transforming the way the world works. Trimble's construction offering ranges from total stations to advanced software, giving the industry tools to transform planning, design, construction and operation of buildings. The company also has products for trades like logistics and agriculture.

**Trimble Buildings** provides the widest breadth of technology solutions for each phase of the building lifecycle. With the industry's only constructible process and full range of tools and content to streamline team collaboration, Trimble solutions make data from complex projects more meaningful and actionable to improve productivity and achieve operational excellence.

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