

RVNL TAGORE PARK METRO SITE VISIT

by

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1. Introduction :

INSDAG undertook a field survey on 4th November, 2023 on the steel bridge constructed near Tagore Park, Kolkata for supporting the piers of Metro Railway project. It is a 76m Single- Span steel bridge on the orange line of the Kolkata Metro Railway Corporation Limited (KMRCL). All other existing are spans of much smaller length of 25m



Fig 1: Tagore Park Metro Site

2. Objective:

This is the rare case in the whole metro route where the unsupported length of the viaduct is quite long (76m) and non-standard for which such a steel structure had to be considered. This is why the survey was aimed to acquire detailed technical insights on the project as well as to get an idea about the work progress.

3. Background :

Sanctioned in 2010, the Orange Line of the overhead metro of Kolkata Metro Rail Corporation Ltd. (KMRCL) between New Garia and Kolkata Airport is finally expected to become functional between New Garia and Ruby only. The construction of the rest part is in progress.

With a projected daily user of five lakhs, New Garia-Airport metro route of Kolkata Metro will offer ease of connectivity for the southern and eastern parts of Kolkata. Rail Vikas Nigam Limited (RVNL) is implementing the 32 km New Garia-Airport Metro Project which is also known as “Orange Line” (Fig 2).

The Kolkata Metro Rail Corporation Ltd. (KMRCL) had earlier expected to make the line operational in 2018. However, the authorities are now hopeful about making a 5.4 km part of the stretch functional by the end of this year 2023.



Fig 2 : New Garia to Airport Metro Route (Orange Line)

4. Engineering Challenges and Solution :

The current Metro viaduct’s alignment between piers nos.166 and 167 had run into the existing canal and culvert in the airport bound flank near Tagore Park. The width of the canal is only 43m. To erect piers, the culvert had to be dismantled. But the process of demolishing the existing girder might have caused several razing amid a very busy stretch of existing road and also the dismantling stage could have taken as long as 10 days. Thus a support in between was ruled out. hence the unsupported continuous span over the existing canal and culvert for the viaduct was finalised.

So, after detailed engineering survey, the implementing agency RVNL came up with an idea of constructing a 76m single-span steel girder having a configuration of a steel box bridge. This kind of “Open Web through Girder” of steel is usually provided on railway track bridges over large rivers or valleys.

For this project without hampering the existing traffic, RVNL has built an RCC culvert on the western side of the EM Bypass through which the traffic is currently being diverted.

5. Project Insights:

I. General Project Details

S.No	Details	Remarks
1	Location	Tagore Park near Fortis Hospital, Anandapur
2	Project:	Single Span Girder for New Garia - Airport Metro Project
3	CLIENT	KMRCL
3	Implementing Agency	RVNL
4	Formwork Consultant	CDC Consulting Ltd
5	Main Girder Steel Structural Consultant	STUP Consultants PVT LTD
6	Girder Fabricator:	Vrinda Engineers Private Limited
7	Executing Agency	Triveni Engicon PVT LTD
8	Steel sourced from	SAIL

II. Technical Details :

- ❖ **Span of the Bridge :** Single span of 76m length (remaining were much shorter in the tune of 25m)
- ❖ **Supports :** Simply Supported
- ❖ **Main Sections Used :** Rolled Sections, Channel Sections, I-Sections, Plates
- ❖ **Steel Grade :** In formwork E250 A conforming to IS : 2062 – 2011 in main structure is of E350 A conforming to IS : 2062 -2011
- ❖ **Bolts :** High Strength Friction Grip (HSFG) Bolt of grade 10.9 with 24 mm dia. conforming to IS 4000-1992
- ❖ **Eccentricity :** There lies a difference between the cg line of the form work and the cg line of the main structure. This eccentricity is 1600m. to counter this eccentricity and balance the unbalanced moment, steel rails have been placed at suitable locations which is as shown in fig 3.



Fig 3 : Counter for eccentricity

- ❖ **Paint Coat :** The final paint has not been done yet . It will be done once all the bolts are placed.
- ❖ **Crane Capacity :** Two nos. 400 MT's crane have been used in this project site.

6. Site Visit Gallery :

Here are some snaps from the site visit





7. Conclusion :

This is a case study where Steel girders had to be selected over precast pre-stressed segmental method of RCC construction which is being followed mostly in the other smaller spans across the route.

This decision had to be taken as the span between the two supports at this particular location was long enough due to the absence of effective supports in between which was not possible due to the existence of a canal and a weak culvert. Thus, the segmental method followed all through was technically unviable and had to be abandoned and such steel girder was selected.

This proposal of using Steel is Unique here in that way.