SITE VISIT REPORT
ON
APNRT ICON TOWER PROJECT, AMARAVATHI

Submitted as a part of Internship Training

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➢ ABSTRACT

This report presents the observations and learnings from the site visit conducted at the **APNRT Icon Tower Project**, located at Amaravathi, Andhra Pradesh. The site visit was carried out as a part of the internship training at **VSR Consultants**.

The main objective of the visit was to gain practical exposure to high-rise construction activities, especially pile foundation systems, deep excavation methods, and dewatering techniques adopted in high groundwater conditions. The report also discusses soil profile, quality control measures, safety practices, sustainability measures, and challenges faced at the site. This visit helped in bridging the gap between theoretical knowledge and real-time site execution.

➢ INDEX

1. INTRODUCTION

Internship training plays an important role in the professional development of civil engineering students. It provides exposure to real-time construction practices and helps understand how theoretical concepts are implemented at site.

As part of the internship at VSR Consultants, a site visit was conducted to the APNRT Icon Tower Project at Amaravathi. The project involves high-rise construction with deep excavation, pile foundation systems, and advanced construction techniques. This visit helped in understanding actual site conditions, execution methods, and coordination between different construction activities.

2. OBJECTIVES OF SITE VISIT

The objectives of the site visit are:

- To gain practical exposure to large-scale construction activities
- To understand pile foundation execution in weak soil conditions
- To study deep excavation methods for basement construction
- To observe dewatering techniques in high groundwater areas
- To understand site safety and permit-based practices
- To relate theoretical knowledge with real-time construction practices

3. **PROJECT & SITE DETAILS**

The APNRT Icon Tower Project is located at **Raya Pudi, Amaravathi**, Andhra Pradesh. The project covers an area of approximately **5.5 acres** and consists of a **high-rise structure with four basements (B4) and 33 floors**, with a total height of about **160 meters**.

The site is located close to the **Krishna River**, which significantly affects soil and groundwater conditions. Due to high structural loads and weak upper soil layers, a pile foundation system is adopted. The site has good accessibility for heavy vehicles, enabling smooth movement of construction materials and machinery.

4. SOIL PROFILE AND GROUNDWATER CONDITIONS

- **Soil Profile**

The top soil layer up to 6 meters consists of black cotton soil, which has low bearing capacity. From 6 m to 14 m, sandy soil is observed. Between 14 m and 24 m, pebbles and gravel layers are present. Below 24 m, hard rock strata are encountered. Due to weak upper layers, shallow foundations are not suitable, and loads are transferred to hard rock using end-bearing piles.

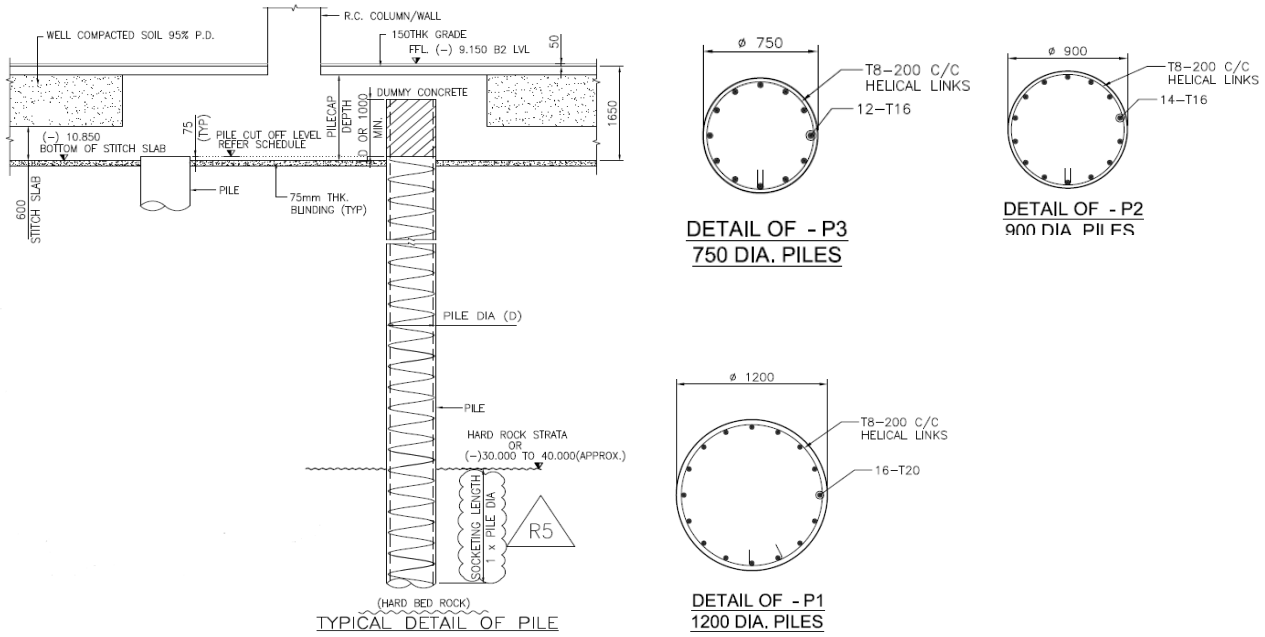
- **Groundwater Conditions**

Due to the proximity to the Krishna River, the groundwater table is high and observed at depths of 1.5 m to 2.5 m below ground level. Continuous seepage was observed during excavation, making dewatering essential to maintain safe working conditions.

5. PILE FOUNDATION SYSTEM

Pile foundations are adopted due to weak soil conditions and heavy structural loads. A total of 1176 piles are provided with diameters of 750 mm, 900 mm, and 1200 mm depending on load intensity. All piles are extended up to the hard rock layer**.**

M35 grade concrete is used with a cement content of 400 kg/m³, and Fe 500 HYSD steel is used for reinforcement. The pile construction process includes boring, borehole cleaning, reinforcement cage placement, and concreting.



Pile foundation sequence

- Site Survey & Setting Out
- Pile Location Marking
- Pre-boring
- Preparation of bund & working platform
- Casing punching
- Filling Bentonite slurry
- Boring and Rock socketing
- Sounding Chain
- Cleaning of Bore Hole
- Lowering of Reinforcement Cage
- Lowering the Tremie Pipes
- Flushing
- Concreting of Pile (M35)
- Casing retrieval

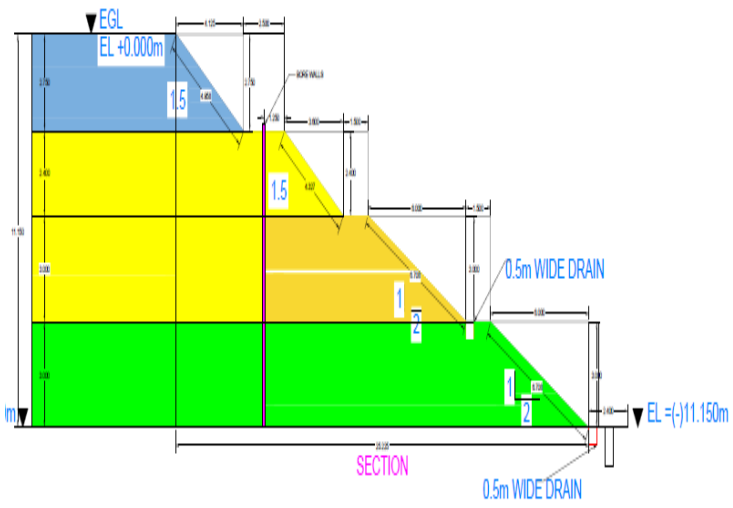
6. EXCAVATION DETAILS

Excavation at the APNRT Icon Tower Project is carried out mainly for basement construction and foundation works. Since the project involves multiple basement levels, excavation plays a critical role in the overall construction process. The total excavation depth required is approximately **10.925 meters**, and the activity demands careful planning due to weak soil conditions and high groundwater levels at the site.

To maintain stability and ensure safety, excavation is executed in a **stage-wise manner**. The process is divided into **four stages** based on depth and soil behaviour. During **Stage 1 and Stage 2**, excavation is carried out with a **slope ratio of 1:1.5**, which helps in preventing soil collapse during shallow excavation. As excavation progresses to greater depths, **Stage 3 and Stage 4** are executed with a flatter **slope ratio of 1:2** to handle increased earth pressure and groundwater influence.

Berms are provided at each excavation stage to improve slope stability and ensure safe working conditions. A berm width of **2.5 meters** is maintained at the first stage, while a width of **1.5 meters** is provided for the remaining stages. These berms reduce the effective slope height and act as safety platforms during excavation. Excavation is carried out carefully around already completed pile foundations to avoid any damage to the piles.

Due to the presence of groundwater, excavation works are closely coordinated with the **dewatering system**. Continuous pumping is required to keep the excavation dry and prevent softening of the soil at the base. Regular monitoring of slopes, berms, and excavation faces is carried out by site engineers to identify any signs of instability. Proper supervision and controlled excavation ensure safe and efficient progress of basement construction.



7. DEWATERING SYSTEM

Due to high groundwater levels, dewatering is a critical activity**.** 88 bore wells of 20 m depth are provided with dewatering pumps. Continuous pumping helps keep the excavation area dry and stable. All 88 pumps together discharge about 5,06,880 Liters per hour.

8. QUALITY CONTROL MEASURES

Quality control measures include slump tests (150–180 mm), concrete cube casting and testing, reinforcement cage inspection, and Dye Penetrant tests on welded joints. Cover blocks are checked to ensure proper concrete cover. All tests are conducted under engineer supervision.

9. SAFETY PRACTICES

Strict safety rules are followed at the APNRT Icon Tower Project to ensure a safe working environment for all site personnel. The use of **Personal Protective Equipment (PPE)** such as helmets, safety shoes, and reflective jackets is **mandatory** for everyone entering the site. Workers are allowed to perform tasks only after proper safety briefing, and unsafe practices are immediately stopped by the safety team.

A **permit-to-work system** is strictly implemented for high-risk activities such as lifting operations and hot work. All lifting activities are carried out using certified equipment and proper signalling methods. Before allowing the movement of heavy machinery, **working platforms are thoroughly inspected and strengthened** to prevent accidents. Regular safety inspections and supervision help in minimizing risks and maintaining a disciplined safety culture at the site.

10. SUSTAINABILITY MEASURES

Sustainability measures are adopted at the APNRT Icon Tower Project to minimize environmental impact and promote efficient use of resources. One of the key practices observed at the site is the use of **Ground Granulated Blast Furnace Slag (GGBS)** as a partial replacement for cement in concrete. About **20% GGBS** is used in the concrete mix, which helps in reducing carbon emissions (CO_2) and improves the long-term durability of concrete. This practice contributes to eco-friendly construction and supports sustainable development.

In addition to material optimization, **efficient resource and energy management** practices are followed at the site. Material transportation is planned in an optimized manner by combining multiple loads in a single trip, thereby reducing fuel consumption and transportation waste. Diesel usage is further minimized by selecting appropriately sized machinery instead of larger equipment wherever possible. These measures help in conserving energy, reducing environmental pollution, and improving overall construction efficiency.

11. CHALLENGES OBSERVED

The site is located about 1 km from the Krishna River, resulting in a high groundwater table and continuous water seepage during excavation.

Rainwater runoff during the rainy season leads to water accumulation and affects excavation progress.

Wet and loose soil conditions make it difficult for heavy machinery to operate without a stable working platform.

Rock socketing during piling increases drilling time and causes additional wear on equipment

12. LEARNING OUTCOMES

- Gained practical understanding of pile foundation execution in weak soil conditions.
- Learned the importance of stage-wise excavation for deep basement construction.
- Understood the role of dewatering systems in managing high groundwater levels.
- Observed quality control and safety practices followed in large-scale projects.
- Improved ability to relate theoretical knowledge with real-time site execution.

13. CONCLUSION

- The site visit provided valuable exposure to high-rise construction activities.
- Practical observation of pile foundations and excavation enhanced technical understanding.
- Dewatering and safety practices highlighted the importance of proper site management.
- The visit helped bridge the gap between classroom learning and field practice.
- Overall, the site visit was a beneficial and enriching experience during the internship.

14. OTHER ACTIVITIES OBSERVED AT SITE

- A farewell function was held at the site for a senior engineer, showing respect and good work culture.
- The birthday of **Mr. Charles** was celebrated at the site, which helped improve team bonding among staff.
- **Republic Day** was celebrated at the project site, creating a sense of unity and national pride among workers and engineers.