

INTERNSHIP REPORT



SUBMITTED BY

SAURABH RAJ

ROLL NO- BTECH/10923/22

BACHELOR OF TECHNOLOGY IN CIVIL ENGINEERING (2022-2026)



बिरला प्रौद्योगिकी संस्थान

Birla Institute of Technology

Mesra, Ranchi (India) - 835215

Birla Institute of Technology, Mesra (BIT, Mesra) is a government funded technical institute (GFTI) situated at Ranchi, Jharkhand, India. It was declared as a deemed university under Section 3 of the UGC Act.

SUBMISSION

I, SAURABH RAJ Roll No: Btech/10923/22, a student of Seventh SEMESTER of bachelor of technology course in CIVIL & ENVIRONMENTAL ENGINEERING humbly submit my report of the following four week training at Nand Vatika Developers Pvt. Ltd project from 02/06/24 to 02/07/24. I am extremely grateful to my seniors and mentors who helped me in successful completion of this internship.

Project Director Dr.Ashish Patnaik Dr. Bindu lal
(Nand Vatika) (Internship Coordinator) (Head of Department)

ACKNOWLEDGEMENT

I would like to extend my gratitude to Nand Vatika Developers Pvt. Ltd for providing me with the opportunity to undertake a four-week internship as a Civil Engineering student. This experience has been invaluable in enhancing my understanding of real-world construction practices and project management.

I am sincerely thankful to Director Mr Aman Fogla and site engineer Mr Azhar for his guidance and support throughout my internship. His insights and mentorship have been instrumental in shaping my professional growth during this period.

I would also like to acknowledge the entire Nand Vatika team for creating a conducive learning environment and providing me with hands-on experience that will undoubtedly contribute to my future endeavors in the field of Civil Engineering.

OBJECTIVES OF SUMMER INTERNSHIP PROGRAM

1. To familiarize with proper planning, design and field operations.
2. To get exposure with the management and communication functions performed with in a construction project.
3. Construction project management.
4. Hands-on Learning: Acquire practical experience in construction methods, materials, and equipment.
5. Safety Awareness: Learn and apply safety procedures and protocols on-site.
6. Team Collaboration: Work effectively within a construction team, understanding roles and responsibilities.

INTRODUCTION

TO

COMPANY



Nand Vatika Developers Pvt. Ltd
Real Estate Builder in Ranchi

ABOUT Nand Vatika Developers pvt ltd;

Nand Vatika Developers Private Limited, is one of the reputable real estate builders in Ranchi, Jharkhand who are eyeing towards changing the dynamics of real estate developers in the state. Nand Vatika, is providing world class architectural designs, superior engineering and magnificent projects ranging from affordable homes to luxury apartments, commercial projects such as malls, markets, etc. We are proud of our innovative designs utilizing the natural resources and keeping intact the beauty of the Ranchi weather integrated with modern designs and technologies.

During the internship at Nand Vatika Developers Pvt. Ltd located in Ranchi, I had the opportunity to gain valuable insights and practical experience in the field of civil engineering and construction management.

Project Information

Name of Project: Nand Vatika Greens

A spacious yet affordable home. Staying in natures' lap with fun amenities to fill your leisure hours in a location that keeps you connected to every part of your city. At Nand Vatika Greens all these little luxuries of urban life comes together to give you the fine living experience you've been dreaming of all along! The leisurely amenities have been designed for the urban soul in need of a rejuvenating break from all the hustle bustle of life. Dive into these luxuries and come out more refreshed than ever before !

Director

Mr. Aman Fogla

Location

Joda Talab Road, Cheshire Home Rd, Ranchi,
Jharkhand 834009.

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Site Inspection

During the site inspection, I observed ongoing construction work across four residential blocks—A, B, C, and D—each currently comprising approximately 12 storeys, with further vertical expansion underway. The site layout was well-organized, with clear demarcation of access paths, material storage areas, and working zones. Structural elements such as columns, beams, and slabs were in various stages of completion, with appropriate safety measures in place, including scaffolding, signage, and PPE usage.

The supervision team was actively coordinating activities to maintain construction timelines. This visit provided practical insights into high-rise building execution and site management practices essential for large-scale residential projects.



SUPER STRUCTURE WORKS

FROM WORK

Formwork is a temporary structure that is erected to support and contain concrete to the required dimensions and shape, till it attains enough strength to become self supporting. The formwork is designed to safely support the combined loads (dead and live loads) during concreting, without bulging or deflecting. Before shuttering, XLPE sheet is laid around the column starter to avoid the slurry flow. The shuttering work is carried out as per the GFC drawings. First Floors typically consist of a subfloor for support and a floor covering used to give a good walking surface. In modern buildings the subfloor often has electrical wiring, plumbing, and other services built in. As floors must meet many needs, some essential to safety, floors are built to strict building codes in some regions. The levels of a building are often referred to as floors, although a more proper term is storey.

SCAFFOLDING

Scaffolding, also called scaffold or staging, is a temporary structure used to support a work crew and materials to aid in the construction, maintenance and repair of buildings, bridges, and all other manmade structures. Steel scaffolding is constructed by steel tubes which are fixed together by steel couplers or fittings. It is very easy to construct or dismantle. It has greater strength, greater durability and higher fire resistance. It is not economical but will give more safety for workers. So it is used extensively now .



COLOUHM REINFORCEMENT



Purpose of Column Reinforcement:

Columns in buildings and structures are vertical load-bearing elements that transfer loads from the superstructure (such as floors and roofs) to the foundation.

Reinforcing concrete columns with steel bars helps:

1. Increase Strength and Load Capacity: Reinforcement bars provide tensile strength to the concrete, which is otherwise weak in tension.
2. Improve Durability: Protects against cracking, corrosion, and other forms of deterioration over time.
3. Enhance Structural Integrity: Reduces the risk of failure due to bending, shear forces, and lateral loads.

Process of Column Reinforcement:

1. Design Stage:
 - Structural Design: Engineers calculate the required dimensions (diameter, spacing) and the number of reinforcement bars based on the structural loads, building codes, and design specifications.
2. Preparation:
 - Cutting and Bending Rebars: Steel rebars are cut and bent to the required shape and size based on the design drawings. This may involve using automated rebar bending machines to ensure accuracy.

3. Installation:

- Placement in Formwork: Reinforcement bars are placed inside the column formwork before pouring concrete.
- Tying: Rebars are tied together at intersections and laps using wire ties or mechanical connectors to form a rigid cage.

4. Concrete Pouring:

- Pouring Process: Once reinforcement is in place, concrete is poured into the formwork, encapsulating the rebars and filling the space around them.
- Vibration and Compaction: Concrete is compacted using vibrators to remove air pockets and ensure proper bonding between concrete and reinforcement.

5. Curing:

- Curing Process: After pouring, the concrete is cured properly to achieve its design strength. This may involve applying water or a curing compound to maintain moisture and temperature conditions conducive to hydration.

6. Quality Control:

- Inspection: Throughout the process, quality control inspectors monitor reinforcement placement, concrete pouring, and curing to ensure adherence to design specifications and construction standards.

7. Post-Construction:

- Testing: After construction, columns may undergo various tests such as nondestructive testing (NDT), load testing, and core sampling to verify structural integrity and compliance with safety standards.

Types of Reinforcement:

- Longitudinal Bars: Placed vertically along the length of the column to resist bending and axial forces.
- Transverse Ties: Horizontal ties that connect longitudinal bars together to maintain spacing and prevent buckling.

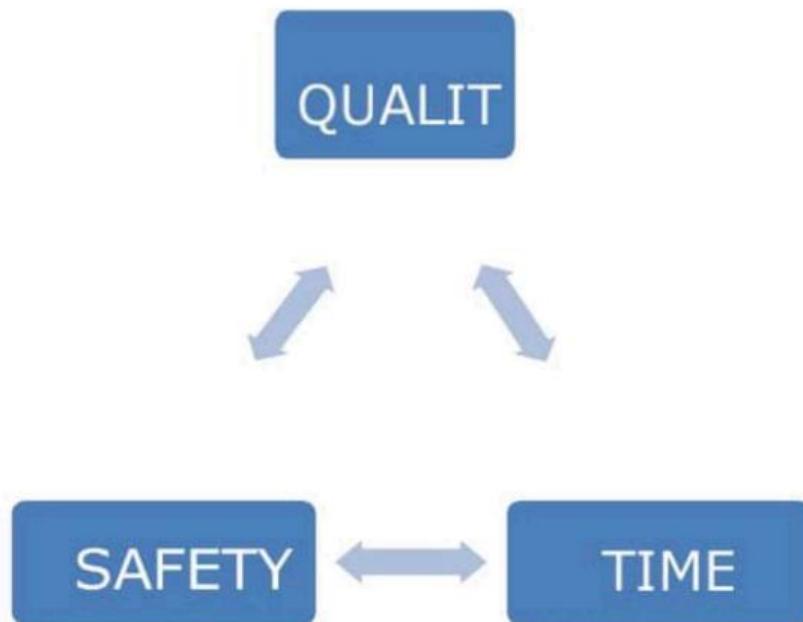
- Stirrups: U-shaped or rectangular ties that encircle longitudinal bars to enhance shear strength and ductility.

Conclusion:

Column reinforcement is a critical aspect of concrete construction, ensuring that columns can withstand the forces they are subjected to throughout their lifespan. Proper design, installation, and quality control are essential to ensure the structural integrity and safety of reinforced concrete columns in buildings and infrastructure projects.

PROJECT MANAGEMENT IN NAND VATIKA DEVELOPERS

The process of planning, organizing and managing tasks and resources to accomplish a defined objective within the limitations on time, resources, cost and quality.



Resources are:

- Drawings Estimates
- Approvals (Modifications, legal)
- Manpower (Technical, labour and tradesmen)
Materials

- Machineries (including equipment, accessories, and tools)

The most important resources in the field of constructions are 3M concept (manpower, materials, and machineries). But apart from these 3M concept **NAND VATIKA DEVELOPERS** have focused on drawings, estimates and approvals also.

PLANNING

- Planning is the process of thinking about the activities required to achieve a desired goal. Planning is based on foresight and, in humans at least, on the fundamental capacity for mental time travel
- The evolution of the capacity to think ahead is considered to have been a prime mover in human evolution.
- Planning is the first and foremost activity to achieve desired results. It involves the creation and maintenance of a plan, such as

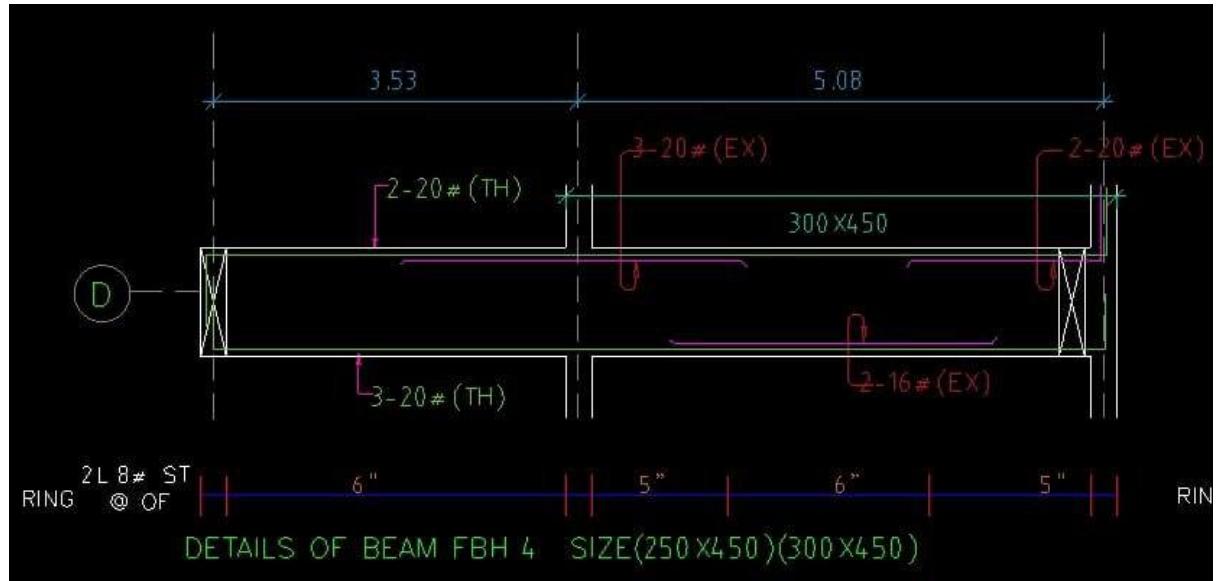
psychological aspects that require conceptual skills.

- There are even a couple of tests to measure someone's capability of planning well. As such, planning is a fundamental property of intelligent behaviour. An important further meaning, often just called "planning", is the legal context of permitted building developments.

SITE SAFETY RULES

- Wear safety helmets while entering into the site.
- Smoking is strictly prohibited.
- Nobody below the age of 18 years is not allowed for site.
- Maintain the premises clean and tidy.
- Good housekeeping, proper materials stacking avoid accidents.
- Don't venture beyond barricade/below scaffolds for safety reasons.
- Use safety nets for every 6m at the appropriate location.

CALCULATION OF WEIGHT OF STEEL REQUIRED TO COMPLETE A BEAM



Calculating the weight of steel in a beam is crucial for accurate material estimation, cost control, and ensuring structural integrity. The process involves determining the volume of steel required and multiplying it by the density of steel. This can be done by first preparing a Bar Bending Schedule , then calculating the cutting length of each bar, and finally using the [unit weight formula](#) to determine the total weight.

Procedure for Calculating Steel Weight in a Beam:

1. Bar Bending Schedule (BBS):

Create a detailed list of all steel bars, including their diameters, shapes, and lengths, as per the structural design drawings.

2. Calculate Cutting Length:

Determine the length of each steel bar, accounting for any bends, hooks, and development lengths.

3. Determine Unit Weight:

Use the formula: Weight (kg/m) = $d^2/162$ (where d is the diameter of the steel bar in mm).

4. Calculate Total Weight:

Multiply the number of bars, their cutting length, and the unit weight to find the total weight of steel for each type of bar (main bars, distribution bars, stirrups).

5. Total Steel Weight:

Sum up the weights of all steel bar types to get the total steel weight for the beam.

Uses of Steel Weight Calculation:

- Material Estimation:**

Accurately determining the quantity of steel required for a beam helps in estimating the total material needed for the project.

- Cost Estimation:**

Knowing the steel weight allows for precise cost estimation of the structural elements, including steel purchase and transportation.

- Structural Design:**

Understanding the steel weight is vital for structural engineers to ensure the beam can safely support the intended loads.

- Construction Efficiency:**

Accurate steel weight calculations streamline the construction process, preventing material shortages or excess.

- Reinforcement Planning:**

Helps in efficient placement and planning of steel reinforcement in the beam.

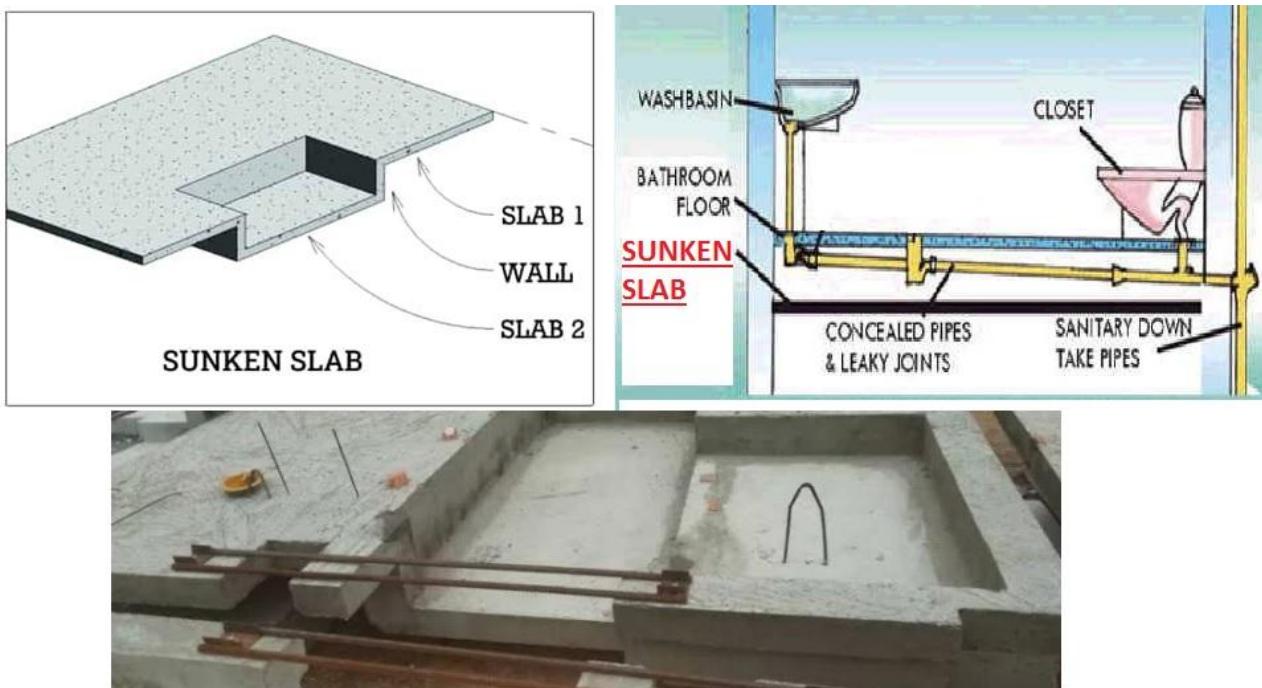
Importance of Steel Weight Calculation:

- Prevents Material Wastage:**

Accurate calculations minimize material wastage, leading to cost savings.

- Ensures Structural Integrity:
Proper steel weight calculation ensures the beam has the necessary strength to withstand loads, preventing structural failure.
- Cost Control:
By accurately estimating steel weight, project costs can be better controlled.
- Efficient Construction:
Accurate calculations contribute to a more efficient and streamlined construction process.
- Compliance with Standards:
Accurate steel weight calculation ensures compliance with relevant building codes and standards.

SUNKEN SLAB



A sunken slab, also known as a sunk slab, is a section of a floor that is intentionally constructed lower than the surrounding floor level, typically to conceal plumbing and drainage systems. It's commonly used in bathrooms, toilets, and laundry areas to hide pipes and create a level floor in the surrounding space.

What it is:

- A sunken slab is a floor slab that is recessed below the standard floor level.

- The depth of the recess is usually between 200-450mm, depending on the specific needs of the plumbing and drainage.
- This recessed area is used to house plumbing pipes, utility ducts, and other fixtures, keeping them out of sight.

Why it's used:

- **Concealing Plumbing:**

The primary reason for using a sunken slab is to hide unsightly pipes and drainage systems, creating a cleaner aesthetic.

- **Drainage:**

In bathrooms and other wet areas, it helps in creating a slope towards the drain, facilitating proper water drainage.

- **Leveling:**

It allows for a level floor in the surrounding area, even with plumbing fixtures below the surface.

- **Aesthetics:**

Sunken slabs can be used to create visual interest and design variations within a space.

- **Ease of Repair:**

While requiring specialized construction, sunken slabs can simplify repairs of plumbing or drainage systems, as access is often easier than with traditional plumbing installations.

Construction:

- The sunken slab is constructed by creating a depression in the floor during the initial building phase.
- The space below is then filled with lightweight materials like sand, brick pieces, or other materials to support the floor above and protect the pipes.
- Waterproofing is crucial to prevent leaks and moisture issues in the sunken area.

In essence, a sunken slab is a clever design solution that allows for the integration of plumbing and drainage within a floor while maintaining a clean and aesthetically pleasing environment.

BATCHING PLANT



In a batching plant, concrete is produced through a series of controlled processes that ensure consistency in its composition and quality.

Aggregate Batching:

- Aggregates (such as sand, gravel, and crushed stone) are stored in bins or silos at the batching

plant. These materials are proportioned by weight or volume according to the mix design specifications.

- The aggregates are typically batched using batch controllers that measure the desired quantities and release them into the mixing drum or truck mixer.

Mixing:

- Once all the ingredients (aggregates, cement, water, and admixtures) are batched, they are introduced into the mixing equipment. This can be a stationary mixer located at the plant or a truck mixer that transports the mixed concrete to the construction site.
- The mixing process ensures thorough blending of all ingredients to achieve a uniform and homogeneous mixture.

Transportation:

- After mixing, the concrete is transported to the construction site. This can be done using truck mixers equipped with rotating drums that keep the concrete agitated during transportation to prevent segregation and setting.

CONCLUSION

The primary objective of this report is a description of practical knowledge. In the period of training, I closely studied the aspects of practical application of various methodologies and learnt the art of being pioneer in solving practical problem faced at site; during the course of my study, I attained the following conclusions. There are differences between theoretical and practical approach to execute various construction process. Theoretical knowledge is insufficient to commence task at site. The various factors such as climatic conditions, manpower, availability of resources and methods involved in construction plays a crucial role in an optimized completion of project.

During this period of 30 days all the site staff helped us a lot to provide all the information about any query. So, we are grateful to NAND VATIKA PVT Ltd. for giving us the opportunity to learn and grow Overall, the internship program laid sound foundation for us to start our career. We are proud to be able to contribute towards nation building during the country's extremely critical period of the history. It will be definitely sensible to scale this practice up and to replicate in other disciplines as well.

REMARKS

Some of the benefits that I gain due to internship program are:

- Practical skills
- Upgrading of theoretical knowledge and able to use it for practical work.
- Developing of communication skill.
- Developing skill of teamwork.
- Improving personal ethics and knowing work ethics.

Lastly, this internship has given me new insights and motivation to pursue a career to visualize work situations better. It acts as a package of knowledge to create confidence in a trainee. It is beyond doubt that this can make one stand in good stead throughout future endeavors