

**MAR BASELIOS CHRISTIAN COLLEGE
OF ENGINEERING AND TECHNOLOGY
KUTTIKANAM PEERMADE**

**DEPARTMENT OF CIVIL ENGINEERING
REPORT ON SITE VISIT**



INDUSTRIAL VISIT REPORT: NATIONAL BUILDERS KALAMASSERY

Date: 7/12/2023

Participants: Second and Third-year B.Tech students from the Department of Civil Engineering

Organized by: Department of Civil Engineering in association with Srishti

INTRODUCTION

The industrial visit to the National Royal Palace construction site at Kalamassery in Ernakulam district was organized by the Department of Civil Engineering in collaboration with Srishti. The project, a 15-floor apartment complex, covering one acre of land with an estimated cost of 15 crores, is undertaken by National Builders. The construction project, primarily utilizing ready mix concrete, has a duration of three years.

ITINERARY

1. Departure

- The journey commenced at 5:27 am, with the students assembling at a designated meeting point.

2. Arrival

- The group reached the National Royal Palace construction site at Kalamassery, Ernakulam, after a journey lasting several hours.

SITE OVERVIEW

1. Project Details:

- Name: National Royal Palace
- Location: Kalamassery, Ernakulam district
- Type: Residential Apartment Complex
- Floors: 15
- Land Area: One acre
- Project Cost: 15 Crores
- Builder: National Builders
- Duration: 3 Years

2. Construction Techniques:

- The construction primarily involves the use of ready mix concrete, indicating a modern and efficient construction approach.

3. Guided Tour:

- The students were provided with a guided tour of the construction site, including visits to different floors, the foundation, and the key structural elements.



4. Safety Measures:

- Emphasis was laid on safety measures undertaken at the site, including the use of personal protective equipment (PPE) and adherence to safety regulations.



5. Interaction

- Students had the opportunity to interact with on-site engineers and project managers, gaining insights into the challenges and solutions encountered during the construction process.

LEARNING EXPERIENCE:

1. Ready Mix Concrete:

- Understanding the significance of ready mix concrete in large-scale construction projects.

2. Project Management:

- Insights into project management, including scheduling, resource allocation, and coordination among different construction phases.

3. Safety Protocols:

- Awareness about the importance of adhering to safety protocols in construction sites and the practical implementation of safety measures.

4. Real-world Challenges:

- Exposure to real-world challenges faced in a construction project, and the strategies employed to overcome them.

BAR BENDING

Bar bending refers to the process of shaping and preparing reinforcing steel bars, commonly known as rebars, for use in construction projects such as buildings, bridges, and other structures. Reinforcing bars are crucial components in reinforced concrete, providing strength and stability to the overall structure.

The process of bar bending involves cutting, shaping, and bending the rebars according to the structural design specifications. Skilled workers, often known as bar benders or steel fixers, use specialized tools and equipment to achieve the required shapes and dimensions of the rebars. These shapes include straight lengths, stirrups, hoops, and other configurations as specified by the structural engineer.

The importance of accurate and precise bar bending cannot be overstated, as it directly influences the structural integrity of the construction. Improperly bent or shaped rebars can compromise the strength and durability of the concrete structure, leading to potential safety hazards.

In summary, bar bending is a critical step in the construction process that involves shaping and preparing reinforcing steel bars to ensure they meet the specific design requirements and contribute to the overall strength and stability of the structure. Skilled craftsmanship and attention to detail are essential to guarantee the success and safety of construction projects.





COMPRESSIVE STRENGTH OF CONCRETE CUBE: AN IN-DEPTH OVERVIEW

Compressive strength is a crucial property of concrete that determines its ability to withstand axial loads or forces applied along its axis. It is one of the most important performance indicators for evaluating the quality and durability of concrete structures. The compressive strength of concrete is typically measured by testing concrete cubes, which are cast and cured under specific conditions.

TESTING PROCEDURE

1. Cube Preparation:

- Standard cubes are typically cast with dimensions of 150mm x 150mm x 150mm or 100mm x 100mm x 100mm, following established standards such as ASTM C192 or EN 12390-1.

- The concrete mix design, including the type and proportions of materials, must be carefully controlled to ensure consistency in results.

2. Curing:

- After casting, the cubes are cured in a controlled environment to simulate field conditions. Common curing methods include water curing, steam curing, or curing in a laboratory-controlled chamber.

- Standard curing periods are 7 days and 28 days, although other durations may be specified for specific applications.



3. Testing Machine Setup:

- The cubes are placed in a compression testing machine, which applies a gradually increasing axial load until failure

- The testing machine should conform to standards such as ASTM C39 or EN 12390-3, ensuring accurate and repeatable results.

4. Loading and Failure:

- The load is applied uniformly at a specified rate until the cube fails.
- Failure modes may include crushing, splitting, or a combination of both. The peak load at failure is recorded.

Interpretation of Results:

1. Compressive Strength Calculation:

- Compressive strength (f_c) is calculated by dividing the maximum load sustained by the cube by its cross-sectional area.

- $f_c = \frac{P}{A}$, where f_c is the compressive strength, P is the maximum load, and A is the cross-sectional area.

2. Quality Assessment:

- The results are compared with design specifications, codes, or project requirements to assess the quality of the concrete.

- Generally, higher compressive strength indicates better quality and durability.

Factors Influencing Compressive Strength:

1. Water-Cement Ratio:

- A lower water-cement ratio generally leads to higher compressive strength.

2. Cement Type and Quality:

- The type and quality of cement significantly influence compressive strength.

3. Aggregate Properties:

- The size, shape, and grading of aggregates play a crucial role.

4. Curing Conditions:

- Proper curing is essential for achieving the specified compressive strength.

The compressive strength of concrete cubes is a fundamental parameter in assessing the performance and durability of concrete structures. Understanding the testing procedure, factors influencing strength, and interpreting results is crucial for ensuring the reliability and safety of concrete applications in construction.

Slump Test for Concrete

The slump test is a widely used method in the construction industry to assess the consistency and workability of fresh concrete. It measures the consistency and flowability of concrete mix, which is crucial for ensuring the quality and performance of the hardened concrete structure. Here's a detailed note on the slump test:

1. Objective:

- The primary purpose of the slump test is to determine the workability of fresh concrete. Workability refers to the ease with which concrete can be mixed, transported, and placed without segregation.

2. Apparatus:

- a. Mould

- A standard slump cone with a base diameter of 8 inches, top diameter of 4 inches, and a height of 12 inches.

- b. Tamping Rod:

- A steel rod, $5/8$ inches in diameter and 24 inches long.

- c. Scoop:

- A tool for filling the cone with concrete mix.

- d. Non-absorbent base plate:

- To place under the slump cone during the test.

3. Procedure:

- a. Preparation:
 - Ensure that all equipment is clean and free from any hardened concrete.
- b. Setting up:
 - Place the slump cone on a smooth, flat, non-absorbent surface.
 - Wet the inner surface of the cone and the base plate.
- c. Filling:
 - Fill the cone with freshly mixed concrete in three layers.
 - Compact each layer with 25 strokes of the tamping rod.
- d. Striking off:
 - Strike off the excess concrete level with the top of the cone using the tamping rod.
- e. Lifting the cone:
 - Lift the cone vertically, allowing the concrete to subside.
- f. Measurement:
 - Measure the difference between the original height of the cone and the height of the concrete slump. This difference is the slump value.

4. Interpretation of Results –

- a. True Slump: - The general drop of the concrete mass is considered the true slump.
- b. Shear Slump:

- If one-half of the cone slides down an inclined plane, it is called a shear slump.

- c. Collapse Slump:

- If the concrete collapses entirely, it is termed a collapse slump.

5. Significance:

- The slump value gives an indication of the consistency and workability of the concrete.

- Different types of construction projects may require different slump values.

6. Precautions

- Ensure the slump cone is clean and free from any obstruction.

- Perform the test in a location protected from wind and direct sunlight.

- Handle the concrete with care to avoid segregation during the test.

7. Limitations:

- The slump test may not be suitable for very dry or very wet concrete mixes.

- It provides an indication of workability but does not account for other properties like air content or segregation.

- The slump test is a simple yet crucial method for assessing the consistency and workability of fresh concrete. Proper interpretation of results helps ensure that the concrete mix meets the desired specifications for a particular construction project.

Remember that specific project requirements and standards may dictate variations in the procedure or acceptance criteria for slump values. Always refer to the relevant standards and specifications for accurate testing and interpretation.



CONCLUSION

The industrial visit to the National Royal Palace construction site was an enriching experience for the students. It provided practical insights into the application of theoretical knowledge acquired in the classroom setting. The opportunity to witness a large-scale construction project, understand the intricacies of project management, and interact with industry professionals enhanced the students' understanding of civil engineering in a practical context.

The Department of Civil Engineering expresses its gratitude to National Builders and Srishti for facilitating this insightful industrial visit, contributing significantly to the holistic education of the students.