Apex Textile Printing Mills (Extension)

Ward No: 07, Holding No: D-84, Chandra, Kaliakoir Pouroshova, Kaliakoir, Gazipur, Bangladesh.

(24.043999, 90.260790)

17 December 2023

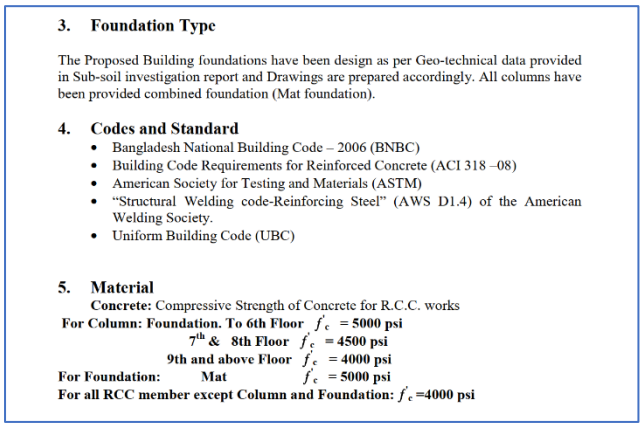
1. Building Information

10 Storied Corporate Office Building: This structure is a ten-storied (G+9) RCC building.

Thermic Fluid Heaters & Chiller Building: This structure is a two-storied (G+1) RCC building.

2. Observation

Observation-1: Design concrete strength needs to confirm by further testing (10 Story Corporate Office Building)



3. **Foundation Type**

The Proposed Building foundations have been design as per Geo-technical data provided in Sub-soil investigation report and Drawings are prepared accordingly. All columns have been provided combined foundation (Mat foundation).

4. **Codes and Standard**

- Bangladesh National Building Code – 2006 (BNBC)
- Building Code Requirements for Reinforced Concrete (ACI 318 –08)
- American Society for Testing and Materials (ASTM)
- "Structural Welding code-Reinforcing Steel" (AWS D1.4) of the American Welding Society.
- Uniform Building Code (UBC)

5. **Material**

Concrete: Compressive Strength of Concrete for R.C.C. works

For Column: Foundation. To 6th Floor f'_c **= 5000 psi**

7th & 8th Floor f'_c **= 4500 psi**

9th and above Floor f'_c **= 4000 psi**

For Foundation: Mat f'_c **= 5000 psi**

For all RCC member except Column and Foundation: f'_c **=4000 psi**

Design report

Test report

Description: In the provided design report concrete compression strength is considered 5000 psi for column & foundation. The factory has provided only a two-cylinder test report for the column in this regard, which does not meet the frequency of testing of BNBC. Also, column was found marginally overstressed considering 6 Kpa live load. The building engineer is required to revise the concrete strength in the design report by performing a core test.

Observation 2: Lack of drawings for roof steel stairs. (10 Story Corporate Office Building)

Steel stair on the roof

Steel stair on the roof

Description: During the inspection, 3 nos of steel stairs were found on the roof adjacent to the stair room. However, no structural details were found for these stairs. The building engineer is required to prepare the as-built drawings with complete structural details.

Observation-3: Inadequate column guard. (10 Story Corporate Office Building)

Inadequate column guard

Trolly impact on column

Description: Inadequate column guards were observed to prevent trolly impact above the 5th floor. The building engineer is required to take necessary action to prevent the trolley impact in the columns.

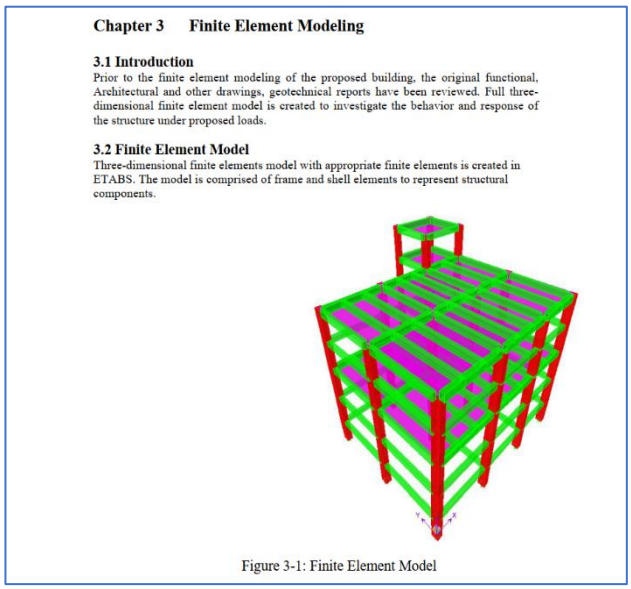
Observation-4: Non-structural elements not anchored or braced. (10 Story Corporate Office Building)

Unbraced racks on the floor

Unbraced racks on the floor

Description: Some racks on floors are not anchored or braced to resist lateral (earthquake) forces. The factory is required to anchor/brace all non-structural elements adequately to resist earthquake forces.

Observation-5: Design report required to be reviewed by RSC for lateral loading. (Thermic Fluid Heaters & Chiller Building)



Chapter 3 Finite Element Modeling

3.1 Introduction

Prior to the finite element modeling of the proposed building, the original functional, Architectural and other drawings, geotechnical reports have been reviewed. Full three-dimensional finite element model is created to investigate the behavior and response of the structure under proposed loads.

3.2 Finite Element Model

Three-dimensional finite elements model with appropriate finite elements is created in ETABS. The model is comprised of frame and shell elements to represent structural components.

Figure 3-1: Finite Element Model

Design report

Thermic Fluid Heaters & Chiller Building

Description: A set of design report was available for the Thermic Fluid Heaters & Chiller Building. Design report need to be reviewed against lateral loading.

1. Action Plan:

Observation	Action Plan	Timeline
Design concrete strength needs to confirm by further testing (10 Story Corporate Office Building)	The building engineer is required to confirm the concrete strength by performing a core test.	within 6 weeks
	Building engineer is required to update the design documents based on verifying in-situ concrete strength in compliance with BNBC-2006.	within 6 weeks
	Building engineer is required to check the column stress accordingly.	within 6 weeks
	Implement remediation work if required.	within 6 months
Lack of drawings for roof steel stair. (10 Story Corporate Office Building)	Building engineer is required to prepare the as-built drawings with complete structural details.	within 6 weeks
Inadequate column guard. (10 Story Corporate Office Building)	Building engineer is required to take necessary action to prevent the trolley from impacting the columns properly.	within 6 weeks
Non-structural elements are not anchored or braced. (10 Story Corporate Office Building)	Building engineer is required to anchor/brace all non-structural elements adequately to resist earthquake forces.	within 6 months
Design report required to be reviewed by RSC for lateral loading. (Thermic Fluid Heaters & Chiller Building)	Prepared design report to be checked against lateral loads following BNBC 2006 by RSC.	within 6 months
	Implement remediation work if required.	within 6 months