EMS Apparels Ltd. (Extension)

Barenda, Kashimpur, Gazipur.

(23.976579, 90.310854)

31 October 2023

RSC RMG SUSTAINABILITY COUNCIL

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1. Building Information:

New Building: Six (G+5) storied reinforced concrete (RC) building.

2. Observations:

New Building

Observation 1: Inconsistencies in design report.

1. As built architectural and structural drawings was available and we checked with the existing building and found ok.
2. Investigation has been done to find out rebar quantity and size of column, beam and slab.
3. Concrete strength f'c=**3500 psi** has been considered for Foundation, column and grade beam and **3000 psi** for floor beam and slab as confirming by cylinder test report and contraction drawings.
4. Steel (rebar) sttrength 72500 psi has been considered for the analysis as per test report.
5. Live load= 60 psf minimum and 250 psf maximum in normal operation has been considered.
6. Wind load for Gazipur = 239 km/hr , seismic zone 2 (Z=0.2 & R=5) has been considered
7. A model based analysis by has been performed by ETABS 2017
8. Allowable soil bearing capacity = **3.26 ksf** as per the soil test report

Material Specification in Design Report

5.12.2 Frequency of Testing

5.12.2.1 Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 60 m^3 of concrete, nor less than once for each 250 m^2 surface area for slabs or walls.

5.12.2.2 On a given project, if the total volume of concrete is such that frequency of testing required by Sec 5.12.2.1 above would provide less than three strength tests for a given class of concrete, tests shall be made from at least three randomly selected batches or from each batch if three or fewer batches are used.

5.12.2.3 When the total quantity of a given class of concrete is less than 20 m^3, strength tests are not required when evidence of satisfactory strength is submitted to and approved by the Engineer.

5.12.2.4 A strength test shall be the average of the strengths of at least two 150 mm by 300 mm cylinders or at least three 100 mm by 200 mm cylinders made from the same sample of concrete and tested at 28 days or at test age designated for determination of f'_c.

Cylinder Test Criteria as per BNBC

Description: A set of design reports was available for new building prepared following BNBC 2020. In the design report, the concrete strength has been considered of 3500 psi for the foundation, column, grade beam and 3000 psi for other members. However, during inspection insufficient concrete cylinder test report was found and that doesn't comply with the frequency of testing requirements as per BNBC (Part VI, Chapter 5, 5.12.2). So the building engineer is required to confirm the design strength of in situ concrete by taking 100 mm dia core (min 4 nos) from lower tier columns.

SHALLOW FOUNDATION:

The average bearing capacity of the shallow foundation as Isolated Column Footing:

-To be considered 1.45 tsf (F.S. = 2.50) at a depth of 10'-0" measured from E.G.L. particularly at and around for BH – 01, 06.

-To be considered 1.64 tsf (F.S. = 2.50) at a depth of 10'-0" measured from E.G.L. particularly at and around for BH – 02, 03, 04, 05.

-To be considered 1.80 tsf (F.S. = 2.50) at a depth of 10'-0" measured from E.G.L. particularly at and around for BH – 07.

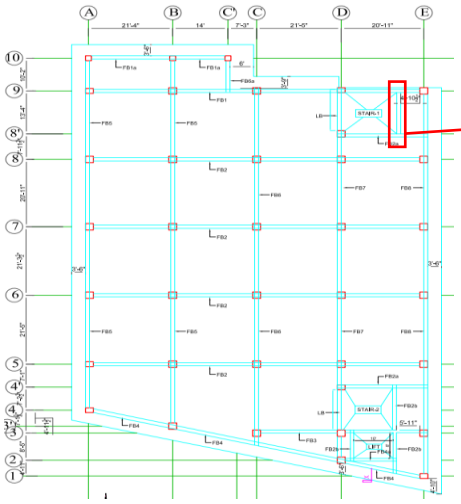
Recommendation of soil test report

1. As built architectural and structural drawings was available and we checked with the existing building and found ok.
2. Investigation has been done to find out rebar quantity and size of column, beam and slab.
3. Concrete strength f'c=**3500 psi** has been considered for Foundation, column and grade beam and **3000 psi** for floor beam and slab as confirming by cylinder test report and contraction drawings.
4. Steel (rebar) sttrength 72500 psi has been considered for the analysis as per test report.
5. Live load= 60 psf minimum and 250 psf maximum in normal operation has been considered.
6. Wind load for Gazipur = 239 km/hr , seismic zone 2 (Z=0.2 & R=5) has been considered
7. A model based analysis by has been performed by ETABS 2017
8. Allowable soil bearing capacity = **3.26 ksf** as per the soil test report

Allowable bearing capacity in design report

Description: In soil test report, different bearing capacity is recommended for different bore hole. But in design report, average bearing capacity is considered for foundation check. FoS for some footing area found marginal considering adjacent bore log data. A geotechnical engineer is required to provide detailed calculations considering adjacent bore hole data in the design report and submit to RSC for review.

Observation 2: Inconsistencies in as-built drawings.



Beam Layout

Marked beam not found on site

Description: In as-built drawing, a landing beam is mentioned in north side stair but not found on site. Moreover, column size and no. of rebar found same from 2nd to top floor for few columns which is different in drawing. Building engineer is required to survey the whole structure and update the as-built drawing.

Observation 3: Water ponding on roof.

Water ponding on Roof

Description: Water ponding on roof slab due to poor drainage system.

Observation 4: Dampness found on cantilever slab and peripheral beam.

Description: Dampness was found on cantilever slab and peripheral beam. Building engineer is required to investigate and repair the dampness as per the recommendation of investigation report.

Observation 5: Non-structural elements found unbraced/not anchored.

Storage rack found within the building without braced/anchored.

Description: Building is required to brace/anchor all non-structural elements.

Observation 6: Exposed rebar on roof.

Description: Exposed rebar found on roof level. Building engineer is required to provide rust proof paint on exposed reinforcement to protect from corrosion.

3. Action Plan:

Observation	Action Plan	Timeline
New Building		
Inconsistencies in the design report.	Building engineer is required to confirm the design strength of in situ concrete by taking 100 mm dia core (min 4 nos) from lower tier columns.	within 6 weeks
Inconsistencies in the design report.	A geotechnical engineer is required to provide detailed calculations considering adjacent bore hole data in the design report and submit to RSC for review.	within 6 weeks
Inconsistencies in the design report.	Implement the recommendations of the design report.	within 6 months
Inconsistencies in as-built drawings	Building engineer is required to survey the structure and produce accurate as-built drawings.	within 6 weeks
Water ponding on roof.	Building engineer is required to improve roof drainage system.	within 6 weeks
Dampness found on cantilever slab and peripheral beam.	Building engineer is required to investigate and repair the dampness as per the recommendation of investigation report.	within 6 weeks
Non-structural elements found unbraced/not anchored.	Building engineer is required to brace/anchor all non-structural elements.	within 6 weeks
Exposed rebar on roof.	Building engineer is required to provide rust proof paint on exposed reinforcement to protect from corrosion.	within 6 weeks