Ayesha Fashion Limited

Plot No. 256, 257 & 258,Adamjee EPZ, Siddirganj, Narayanganj, Bangladesh.
(23.678461, 90.523814)
06 February 2023

RSC RMG SUSTAINABILITY COUNCIL

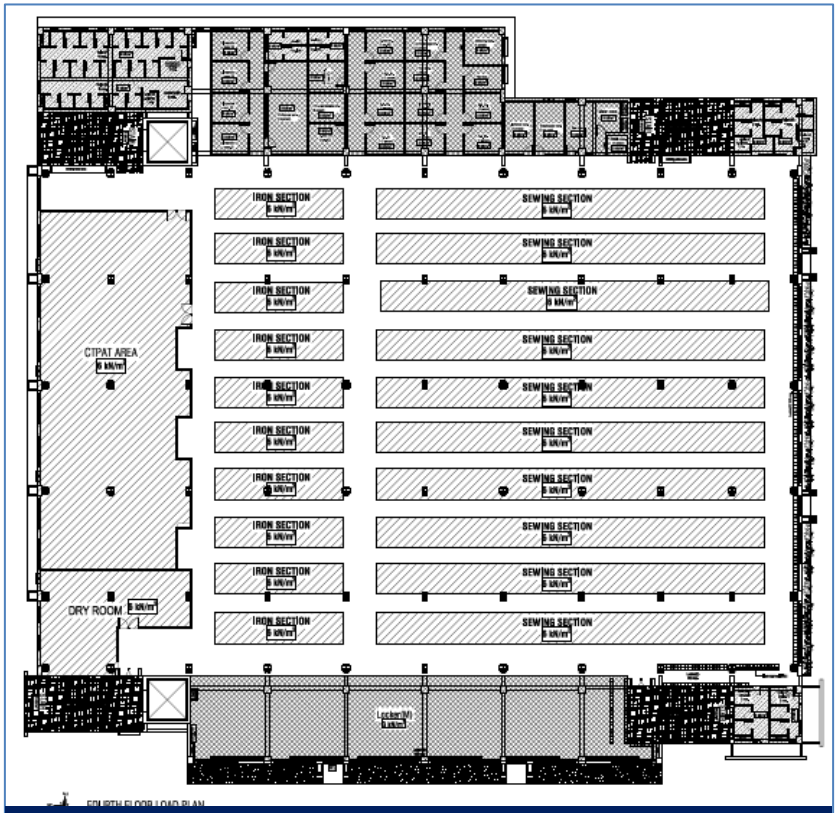
Buildings Information

1. Building-1 (Main Production Building) : Six-storied (G+Mz+5) steel & RCC structure
2. Building-2 (Utility Building) : Two-storied (G+1) reinforced concrete building
3. Building-3 (Fire Pump & Jhut Room) : Single storied (B+G) reinforced concrete building
4. Building-4 (Guard Room with Fire Control Room) : Single storied (G) reinforced concrete building
5. Building-5 (RMS Room) : Single storied (G) reinforced concrete building
6. Building-6 (Diesel Room) : Single storied (G) masonry building

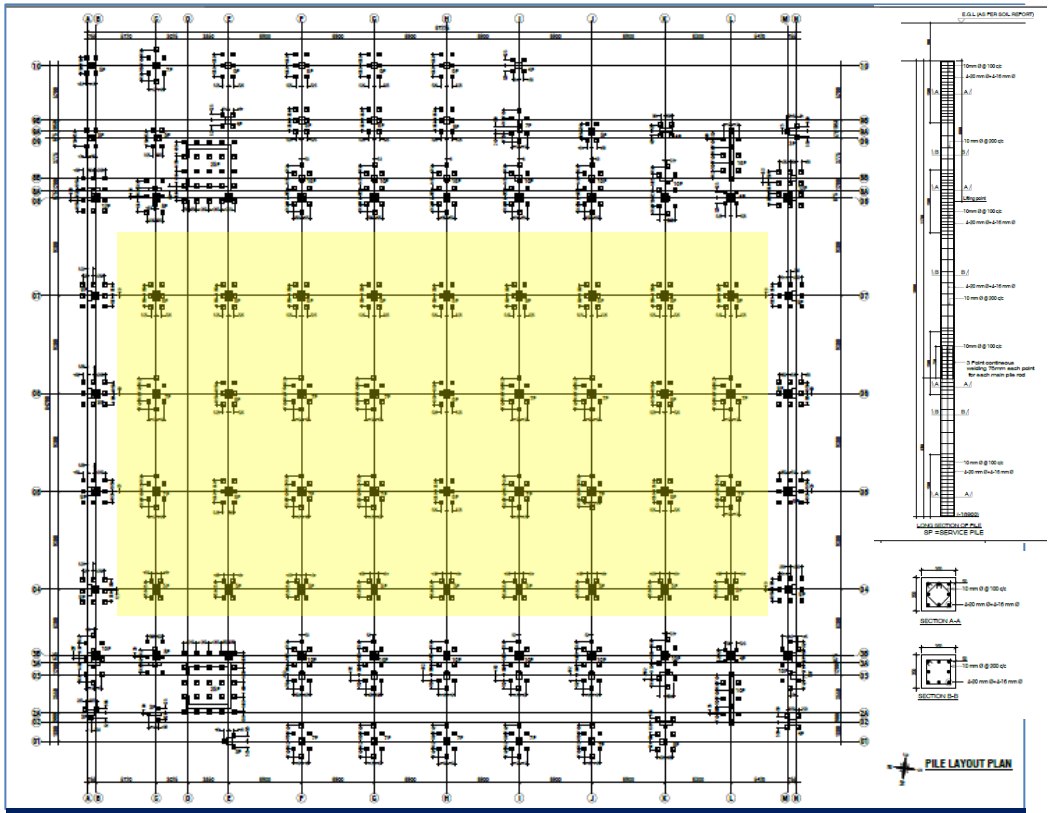
Observations

Cursory calculation indicates internal steel columns stressed above normal design limit

Observation: Main Production Building (Steel Part)



Load plan (6 KPa)



Pile layout and section

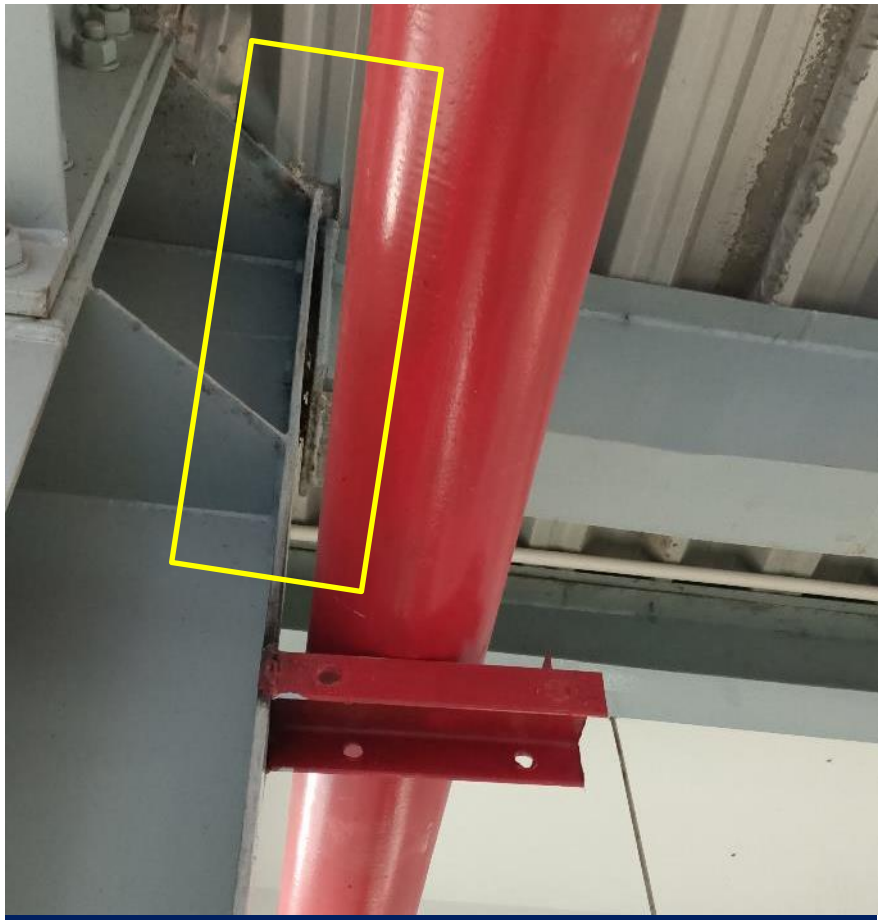
The cursory calculation indicates that internal columns stress exceeds the normal design limit considering a typical floor live load 6 kPa, and minimum tensile strength of steel plate 250 MPa. The building engineer is required to review the design, loads, and column stresses.

Observation: Main Production Building (Steel Part)

Bolt missing and connection gap

Observation: Main Production Building (Steel Part)

Bolt missing and significant gaps observed in beam-column joint at several locations. Building engineer is required to carry out suitable remedial works.



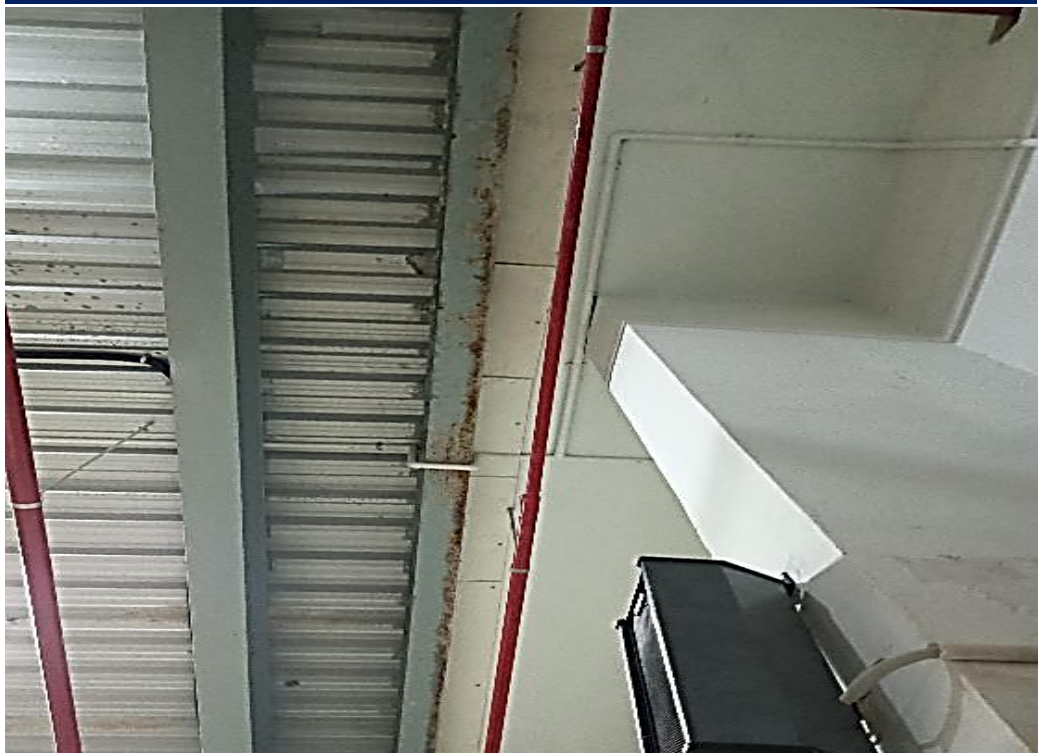
Gap observed in connections

Bolt missing

Observation: Main Production Building (Steel Part)

Corrosion in steel member

Corrosion in steel member of staircase was observed in the several locations. The building engineer is required to suggest proper remedial measure accordingly



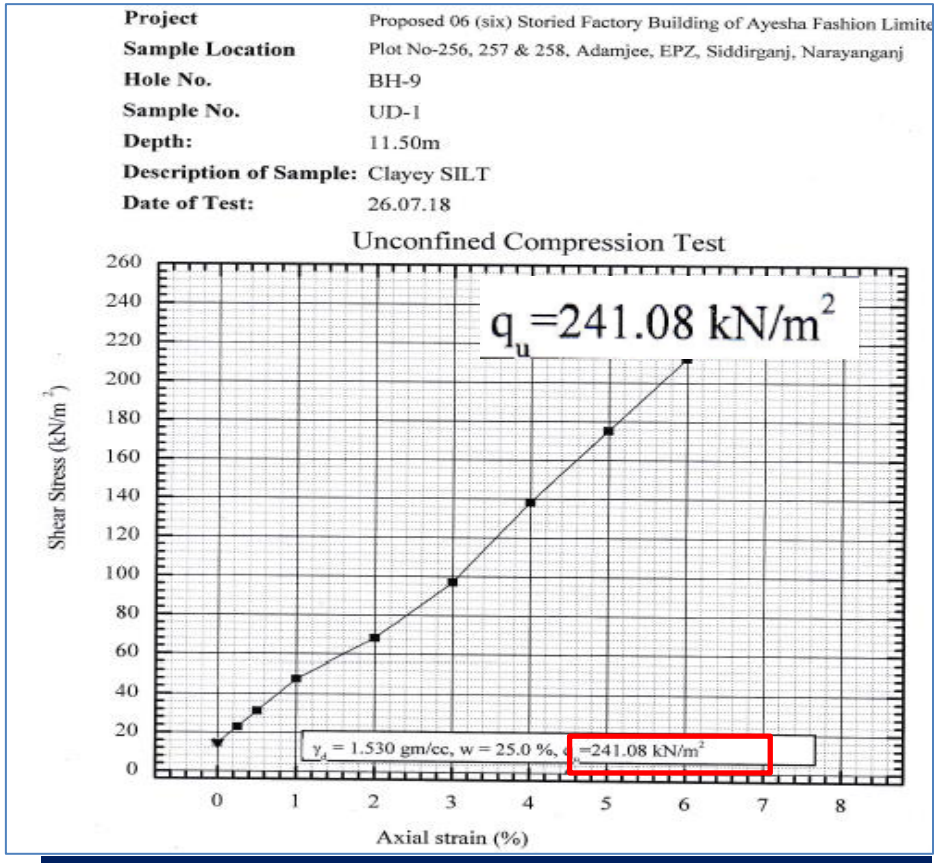
Corrosion in steel member

Observation: Main Production Building (Steel Part)

Design report need to be revised

Observation: Main Production Building (RC Part)

Foundation capacity required to revise in the design report. As per provided soil test report qu=241.08 KN/m2 but in the design report qu = 400 KN/m2 considered for pile capacity calculation. Moreover, Serviceability and irregularity check was not found in this design report.



Project	Proposed 06 (six) Storied Factory Building of Ayesha Fashion Limite
Sample Location	Plot No-256, 257 & 258, Adamjee, EPZ, Siddirganj, Narayanganj
Hole No.	BH-9
Sample No.	UD-1
Depth:	11.50m
Description of Sample:	Clayey SILT
Date of Test:	26.07.18

Soil test report

6.4 Adequacy of Foundation

All the foundations are found adequate in terms of the safe soil bearing capacity. The ultimate soil bearing capacity is calculated by following Meyerhof (1956) equation and α Method considering the undrained condition. **The borehole BH-09 is followed for calculating the ultimate soil bearing capacity according to the provided soil investigation report by the Client.**

Sample calculation of ultimate pile capacity:

The point bearing capacity of the pile for clay soil, $Q_p = N_c*c_u*A_p = 9c_u*A_p$

[References: equation 11.18, article 11.7, Principles of Foundation Engineering, seventh editiong]

q_u = 400 kN/m²

q_u = 400 kN/m^2

[References: Tal oundation Engineering, seventh editiong]

So, $c_u = q_u/2 = 400/2 = 200$ kN/m².

Pile size = 350 mm x 350 mm

So $A_p = 0.35*0.35 = 0.1225$ m².

Now, $Q_p = N_c*c_u*A_p = 9c_u*A_p = 9*200*0.1225 = 220.5$ kN = 49.56 kip.

The frictional (skin) resistance in clay soil, α Method,

According to the α method, the unit skin resistance in clayey soils can be represented by the equation,

$f = \alpha*c_u$

[References: Equation 11.53, article 11.12, Principles of Foundation Engineering, seventh editiong]

α = 0.5 for clays with $c_u \geq 70$ kN/m² for driven pile.

[References: article 3.10.1.12 (i), BNBC 2020]

q_u = 241.08 kN/m²

[References: UCT, BH#09, depth 11.50m, report on the subsoil investigation for the proposed six storied factory building of Ayesha Fashion Limited]

So, $c_u = q_u/2 = 241.08/2 = 120.54$ kN/m².

$Q_s = fp\Delta L = \alpha*c_u*p*\Delta L = 0.5*120.54*(4*0.35)*19.5 = 1645.37$ kN = 369.89 kip.

[References: Equation 11.55, article 11.12, Principles of Foundation Engineering, seventh editiong]

So, the ultimate pile bearing capacity, $Q = Q_p+Q_s = 49.56+369.89 = 419.45$ kips.

Sample calculation in design report

Building engineer is required to revise the design report for foundation calculation and submit to RSC.

Observation: Main Production Building (RC Part)

Beam layout missing for 1st floor

Observation: Utility Building

Beam layout was not found in the provided drawings of the Utility Building. The building is required to survey the whole structure and prepare full set of as-built drawings with complete information.

First floor beam

Observation: Utility Building

Priority Actions

Problems Observed

Main Production Building :

Item-1: Cursory calculation indicates internal steel columns stressed above normal design limit.
Item-2: Bolt missing and connection gap.
Item-3: Corrosion on steel member.
Item-4: Design report need to be revised.

Utility Building:

Item-5: Beam layout missing for 1st floor.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Cursory calculation indicates internal steel columns stressed above normal design limit. (Main Production Building-Steel Part)	Building Engineer to review design, loads and column stresses.	6-weeks
02	Cursory calculation indicates internal steel columns stressed above normal design limit. (Main Production Building-Steel Part)	Produce and actively manage a loading plan for all floor plates within the factory, considering floor, column and foundation capacity.	6-weeks
03	Cursory calculation indicates internal steel columns stressed above normal design limit. (Main Production Building-Steel Part)	Complete implementation of any remedial works.	6-months
04	Cursory calculation indicates internal steel columns stressed above normal design limit. (Main Production Building-Steel Part)	Continue to implement loading plan.	6-months
05	Bolt missing and connection gap (Main Production Building-Steel Part)	Building engineer is required to repair the gap in connections with a suitable method.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
06	Bolt missing and connection gap (Main Production Building-Steel Part)	Install the missing bolt where necessary.	6-weeks
07	Corrosion in steel member (Main Production Building-Steel Part)	The building engineer to remove the corrosion and apply suitable corrosion resistance coating.	6-weeks
08	Design report need to be revised. (Main Production Building-RC part)	Building engineer to update the design document including foundation check, FEA model & design report in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC.	6-weeks
09	Design report need to be revised. (Main Production Building-RC part)	Implement the recommendations of design report.	6-months
10	Beam Layout missing for 1st floor (Utility Building)	Building Engineer is to survey the whole structure and update as-built drawings representing accurate site condition.	6-weeks