



Amir Shirts Ltd.

Sufua, Kalikapur Union, Chauddagam, Comilla, Bangladesh
(23.301700, 91.290802)

30th October 2016

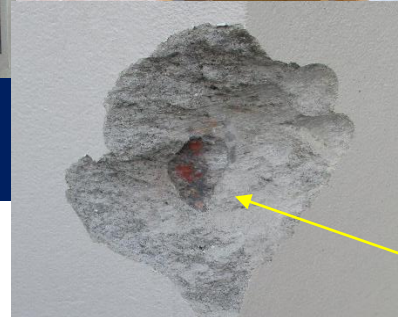
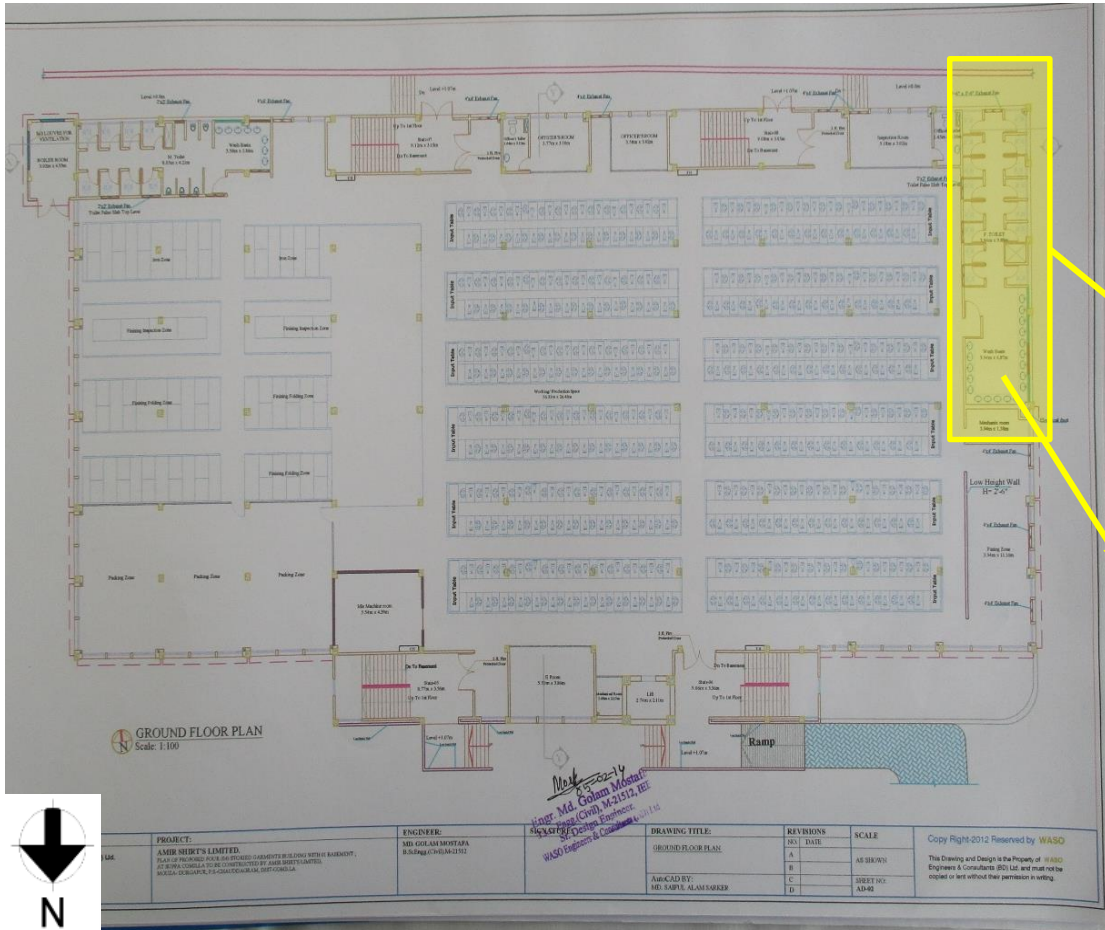




Observations



Column to be stressed above normal design limits



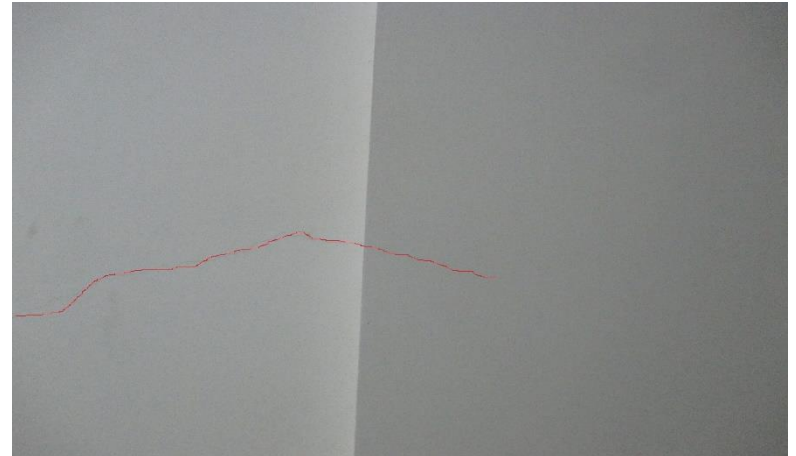
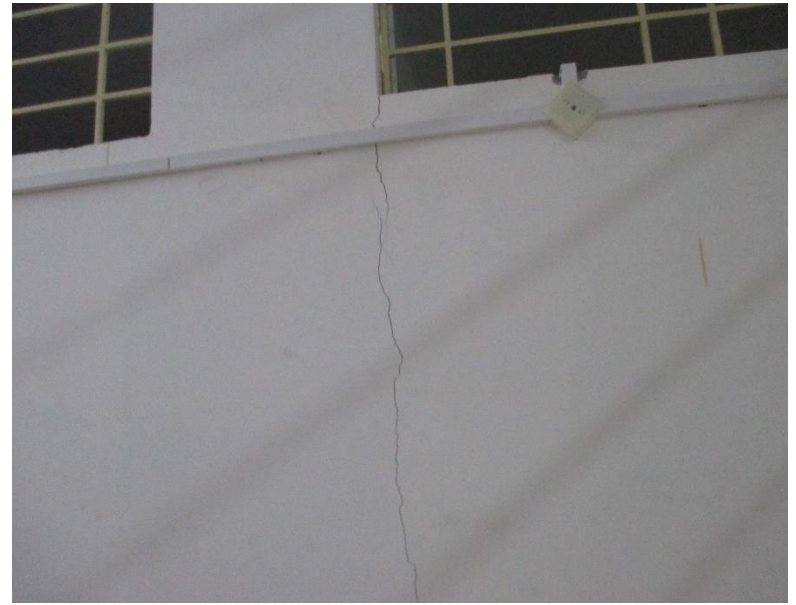
Brick Aggregate

Cursory calculation indicates that Columns appears to be stressed above normal design limits

Observation: Production Building Unit-1



Cracks on basement walls



Cracks have been observed at several basement walls. Considering the location of cracks it is recommended that, building engineer requires to investigate and continuous monitor the cracks.



Discrepancies between drawings & on-site observations

Observation: Production Building Unit-1



COLUMN SCHEDULE

COLUMN NO.	FLOOR WISE COLUMN SIZE			REMARKS
	BELOW FFL	BELOW F.F.L	above F.F.L TO ROOF	
C1	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	
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C2	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	
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C3	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	
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C4	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	
	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	
C5	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	
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C6	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	
	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	MARK: 4'-0" x 4'-0" ST TE. BAR: 10mm @ 4'-0" x 4'-0"	

FOOTING SCHEDULE

TYPE OF FOOTING	SIZE OF FOOTING	DIMENSIONS		REINFORCEMENT	REINFORCEMENT		
	LONG. DIRECTION	DI	DI	As (mm ²)	Ast (mm ²)		
F-1	4'-0" x 4'-0"	12'-0"	20'	4"	30"	1100mm @ 10"	1100mm @ 10"
F-2	4'-0" x 4'-0"	12'-0"	18'	4"	22"	1100mm @ 10"	1100mm @ 10"
F-3	4'-0" x 4'-0"	12'-0"	16'	4"	22"	1100mm @ 10"	1100mm @ 10"
F-4	4'-0" x 4'-0"	12'-0"	18'	4"	30"	1100mm @ 10"	1100mm @ 10"
F-5	4'-0" x 4'-0"	12'-0"	18'	4"	22"	1100mm @ 10"	1100mm @ 10"
F-6	4'-0" x 4'-0"	12'-0"	18'	4"	22"	1100mm @ 10"	1100mm @ 10"
F-7	4'-0" x 4'-0"	12'-0"	18'	4"	22"	1100mm @ 10"	1100mm @ 10"
F-8	4'-0" x 4'-0"	12'-0"	18'	4"	22"	1100mm @ 10"	1100mm @ 10"

Mr. M. Golam Mudda
 Engr. M. Golam Mudda
 P.E. Reg. (Civil), M-2312, E
 So. Design Engineer
 WSP Engineers & Architects Pvt. Ltd.

Rebar diameter doesn't match with as built drawing.



Water ponding and Rebar Corrosion at roof.



Exposed rebar was observed on roof which is suspected to corrosion. No corrosion resisting coating on rebar has found.

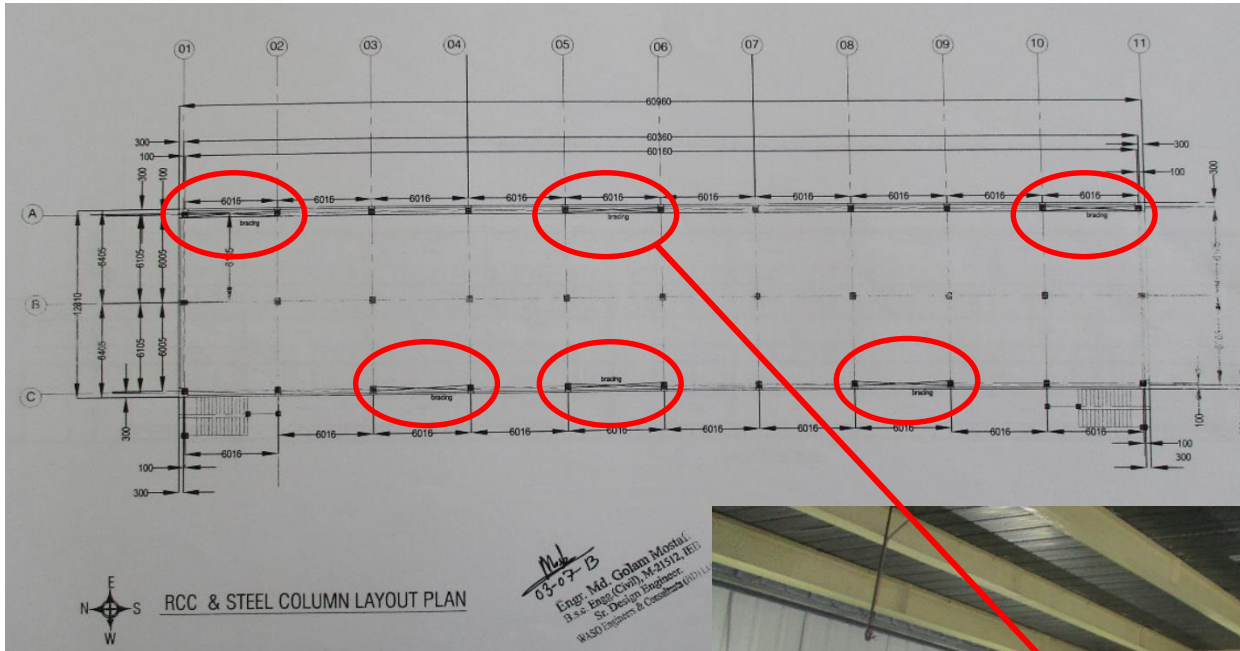


- Water ponding was observed on South-West corner of the roof floor.
- No water proofing layer and proper drainage system has observed on roof.

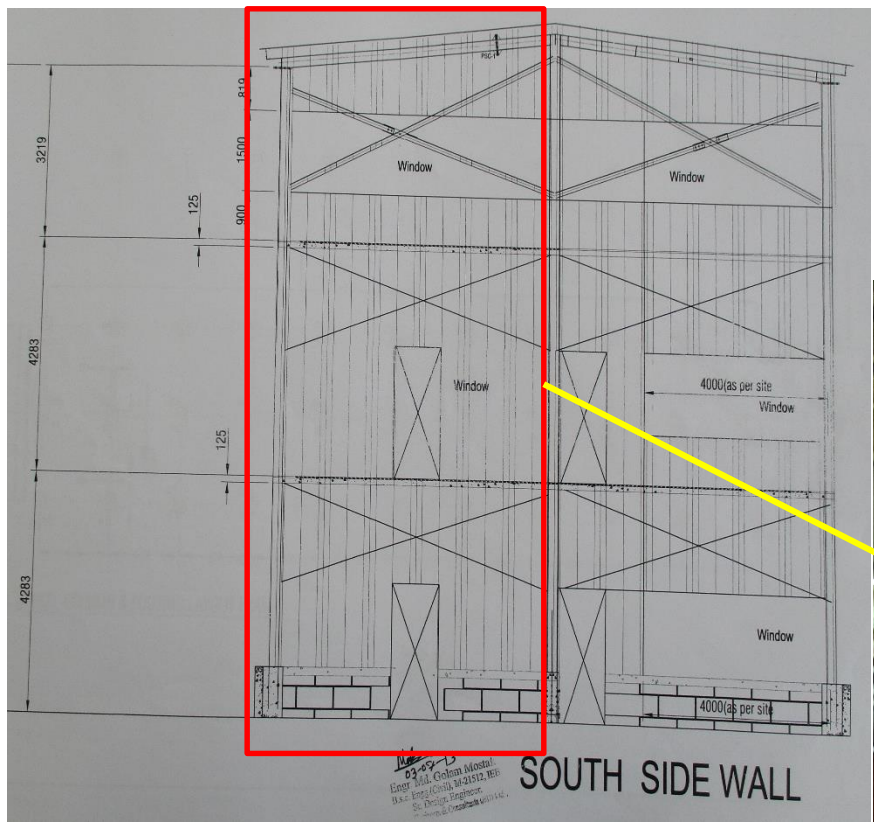
Observations



Lack of vertical bracing may effect the overall stability



Bracings has shown on drawing at longitudinal and transverse direction but on site bracings were not installed according to the drawing. Lack of bracing may effect the stability of the building. Building engineer requires to check the stability of the building against lateral loading.



Missing vertical bracing at south side.



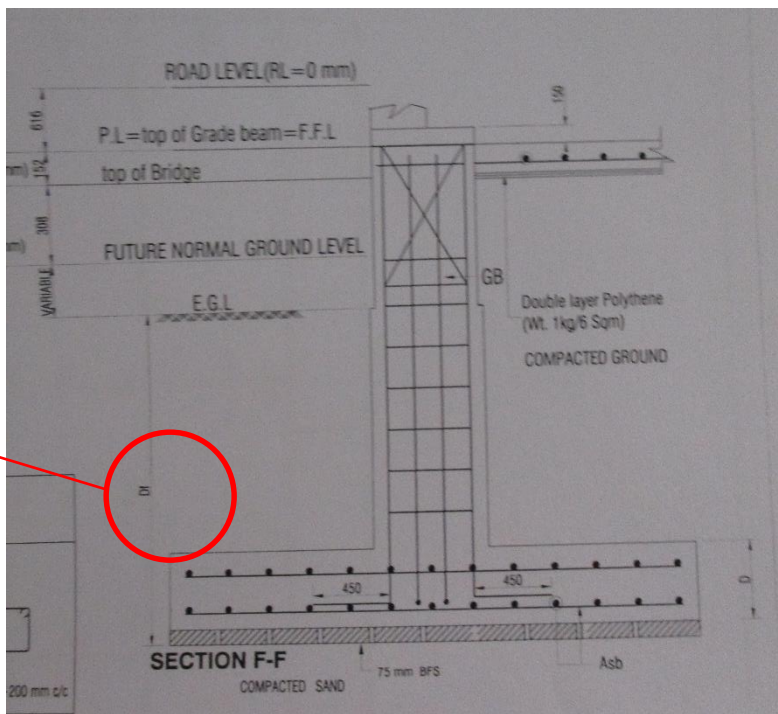
Foundation adequacy requires to be check



FOOTING SCHEDULE

ID	SIZE L x B	DIMENSIONS		Bottom
		Df	D	
F1	1500 x 1500	1500	300	12mmØ @150c/c
F2	1550 x 1550	1500	300	12mmØ @150c/c
F3	1500x1500	1500	350	12mmØ @150c/c

L.D= Long Direction, S.D= Short Direction, B.D= Both Direction
ALL DIMENSIONS ARE mm



COMPLETION FOR CONSOLIDATION SETTLEMENT
The consolidation settlement can be calculated from test result of unit weight and consolidation tests. The approximate average settlement of building = 0.78 inch

RECOMMENDATIONS:
On the basis of aforesaid conclusions, the following recommendations are suggested for Proposed 3 (Three) - Storied Building, At Dag No.- 9, 10, 11, J.L. No.- 82, Mouza - Durgapur, Kalkapur Union, Thana - Choudagram, Dist.- Comilla, Bangladesh.

SHALLOW FOUNDATION:
The average bearing Capacity of the Shallow Foundation as Isolated column footing May be considered in the following way:
- To be considered 1.20 Tsf (F.S.= 2.50) at a depth of 8ft measured from E.G.L. particularly at and around for BH - 2 & BH - 3 only.
- To be considered 1.20 Tsf (F.S.= 2.50) at a depth of 13ft measured from E.G.L. particularly at and around for BH - 1 only.

The soils below Shallow Foundation as Isolated column footing's trench area are Compacted (properly 95%) by sand (F.M.=1.30) filling with 6" layer by layer from 13ft to 8ft, then bearing capacity of soil is considered 1.20 Tsf (F.S.=2.50) at a depth 8ft measured from E.G.L for BH - 1 only.

For BH - 4 only
SAND PILE:-
Sand pile may be provided with compaction from the depth of 5ft and downwards pile should be average 8 inch diameter and the embedment length up to 25 ft from the base level of footing area, considering spacing of pile 1.5 ft center to center. After sand piling the bearing capacity of soil should be 1.25 tsf, confirming by plate load test.

OR
R.C.C. CAST-IN-SITU PILE :
The average bearing Capacities (F.S = 2.50) of different depth of 16" & 18" & 20" diameter pile with the embedment length up to 55ft from E.G.L of each boring may be considered as follows:

Length below from E.G.L	16 inch dia	18 inch dia	20inch dia
45' - 00"	34.00 ton	44.00 ton	54.00 ton
50' - 00"	38.00 ton	48.00 ton	58.00 ton
55' - 00"	42.00 ton	52.00 ton	62.00 ton

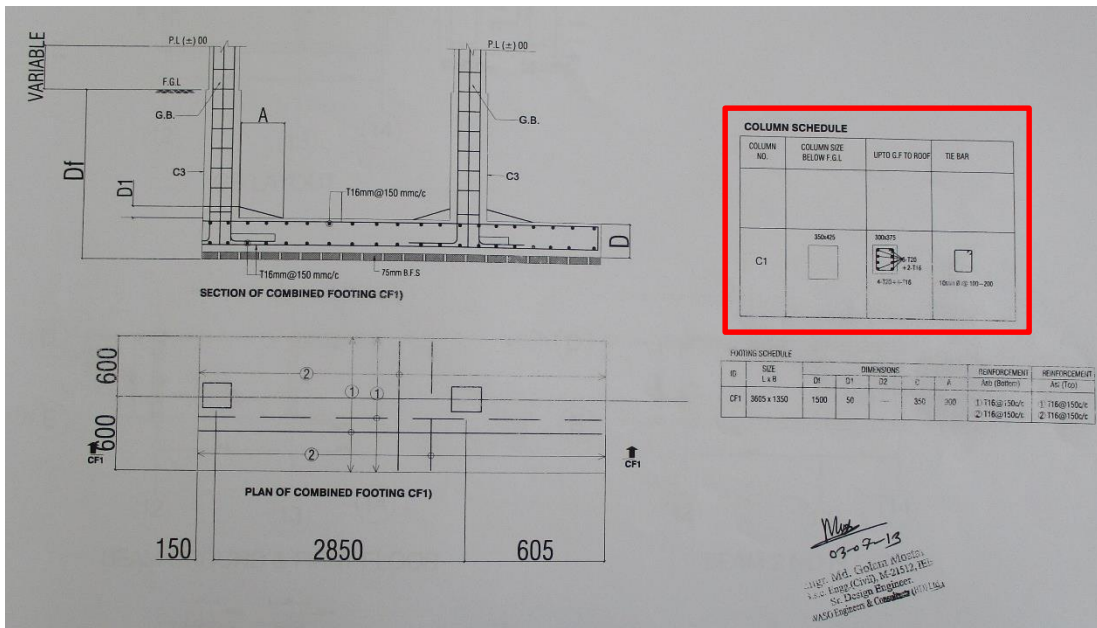
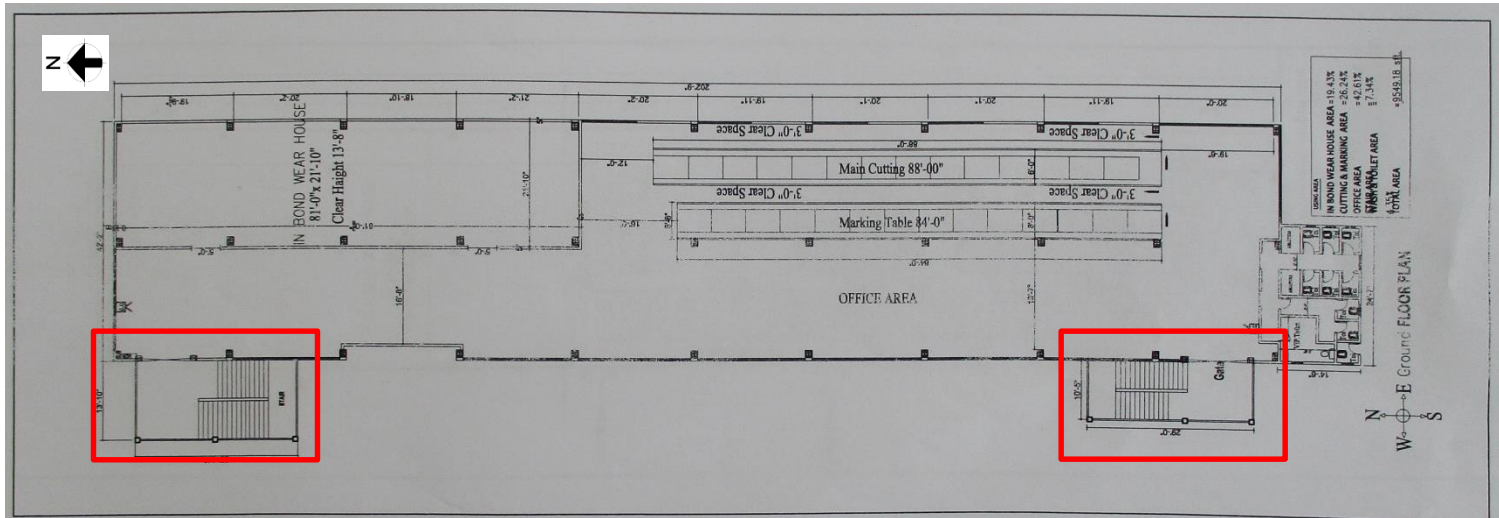
Note:
a. 1Tsf=2ksf = 107.25 kN/m² , 1 Ton = 2000lbs = 9.87 kN.
1m = 3.28 ft , E.G.L= Existing Ground level & F.S.= Factor Safety.
b. The designer may select any other alternative type, depth as well as the bearing capacity of the foundation in the light of information provided in this report.
c. Foundation base should be kept dry during construction period.
d. Pile load test should be performed. If pile load test is not performed then the value of the pile capacity should be considered half.

Signature: E. Rafique
Stamp: ACCORD (Association for Fire and Building Safety in Bangladesh)

As per soil test report, the foundation was supposed to be at a depth of 2400 mm. But foundation depth of 1500 mm is stated in the as-built drawing. Hence, building engineer requires to review and verify bearing capacity and foundation adequacy for the actual site condition.



Discrepancies between drawings & on-site observations



No. of rebar and column size doesn't match with drawings on stair. Building engineer requires to review the design considering existing condition.



Priority Actions



Problems Observed

Production Building Unit-1:

1. Column to be stressed above normal design limits.
2. Discrepancies between drawings & on-site observations.
3. Cracks on basement columns and walls.
4. Water ponding and rebar corrosion observed at the roof.

Production Building Unit-2:

1. Lack of vertical bracing may effect the overall stability.
2. Foundation adequacy requires to be check.
3. Discrepancies between drawings & on-site observations.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Column to be stressed above normal design limits(Production Building Unit-1)	Factory Engineer to review design, loads and columns stresses.	6-weeks
2	Column to be stressed above normal design limits(Production Building Unit-1)	Verify in-situ concrete stresses by 100mm dia. cores from min. 4 no. column from ground floor level.	6-weeks
3	Column to be stressed above normal design limits(Production Building Unit-1)	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	6-weeks
4	Column to be stressed above normal design limits(Production Building Unit-1)	Make structural alterations if required as advised by Factory Engineer.	6-months
5	Column to be stressed above normal design limits(Production Building Unit-1)	Continue to implement load plan.	6-months
6	Cracks on basement walls(Production Building Unit-1)	Remove finishes to investigate if cracking extends into structure. Any cracks found should be repaired.	6-weeks
7	Cracks on basement walls(Production Building Unit-1)	Continue to monitor building for signs of cracking on on-going basis and take appropriate action.	6-months



Item No.	Observation	Recommended Action Plan	Recommended Timeline
8	Discrepancies between drawings & on-site observations(Production Building Unit-1)	Engage a Building Engineer to survey the structure and update a full set of “as-constructed” drawings.	6-weeks
9	Water ponding and rebar corrosion observed at the roof	For both durability and serviceability, rust proof paint or any appropriate method is recommended.	6-weeks
10	Water ponding and rebar corrosion observed at the roof	Waterproofing on the roof slab is to be applied. Moreover the roof slab drainage system should be investigated and improved.	6-months
11	Lack of vertical bracing may effect the overall stability(Production Building Unit-2)	Building Engineer to review stability system for lateral loading as per BNBC. Building Engineer to design and detail structural upgrading work where necessary to ensure adequate stiffness of bracing system.	6-weeks
12	Lack of vertical bracing may effect the overall stability(Production Building Unit-2)	Where required, remedial measures to steelwork to be carried out.	6-months



Item No.	Observation	Recommended Action Plan	Recommended Timeline
13	Foundation adequacy requires to be check(Production Building Unit-2)	Building engineer requires to review the foundation design considering the bearing capacity of the soil and actual depth of footing.	6-weeks
14	Foundation adequacy requires to be check(Production Building Unit-2)	Carry out remedial works if required.	6-months
15	Discrepancies between drawings & on-site observations(Production Building Unit-2)	Engage a Building Engineer to survey the structure and update a full set of “as-constructed” drawings. Also review the design considering existing condition.	6-weeks