

Abir Fashions (Extension)

Plot #44, Road #02, Kutubail, Fatullah, Narayanganj.

(23.642584, 90.485064)

11 February 2024



1. Building Information

- 1) **Production Building-5:** The building is a five-storied (G+M+4) reinforced concrete building including a steel roof shed and a mezzanine floor at ground.
- 2) **Production Building-6:** The building is a five-storied (G+M+4) reinforced concrete (RC) building with a steel mezzanine.
- 3) **Production Building-7:** The building is a six-storied (G+M+5) building where the foundation to 1st floor is RC structure and 2nd floor to roof is steel structure.
- 4) **Utility Building:** The building is a partially three-storied (B+G+2) RC structure with a small basement including a lightweight rooftop shed.
- 5) **Shed-2:** Single-storied steel shed.

2. Observations:

Observation-1: Inadequate number of concrete cylinder test report (Production Building-5).

TEST REPORT

Sl. No.	Date of Test	Specimen	Specimen Size	Specimen Weight	Compressive Strength (MPa)	Compressive Strength (Psi)	Remarks
1	11/11/2019	C-1	150mm x 300mm	11.24	24.13	3500	Compressive

Notes: Specimens were tested in standard condition. * Compressive strength is the average of three test results.

Tested by: *[Signature]*
Chief Engineer
BUET Concrete Laboratory

6.1) Basic Design Consideration:

Design of structural elements has been done According to BNBC 2006 and ACI-318-99. Materials strength data has been collected from core test and rebar test and reinforcement data has been collected from Ferro Scan Report. Foundation data has been collected from structural drawings and soil capacity has been calculated from soil report.

6.2) Material Data

The following strength parameter is considered from Cylinder test performed by BRTC, BUET. The calculation of average concrete strength has been described below.

SL/No	Strength	
01	Column Concrete Grade	3500 Psi
02	Slab Concrete Grade	3000 Psi
03	Beam Concrete Grade	3000 Psi
04	Flexural strength of all Reinforcement, f_y	60,000 Psi

The test reports have been attached below

Description: Concrete design strength for column is considered as 24.13 MPa (3500 Psi). However, only one cylinder test report (without average value) was available from column which doesn't meet the frequency test requirement as per BNBC. The building engineer is required to take adequate number of cores from lower level to justify the design strength.

Observation-2: Lack of information in soil test report (Production Building-5).

CONCLUSION & RECOMMENDATIONS

This Recommendations submitted in this report are prepared on the basis of supplied SPT & available subsurface Samples from field for the exclusive use of the following project

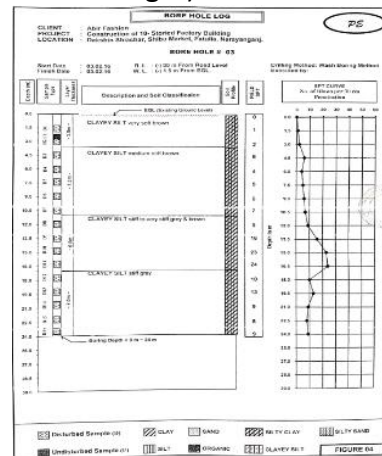
Name :	Abir Fashion
Name of Project :	Construction of 10- Storied Factory Building
Location :	Dakshin Shachar, Shibui Market, Fatulla, Narayanganj.

From the field and laboratory test results, it can be concluded as follows:

- The sub-soil formation encountered at the proposed site is almost homogeneous. The sequence of litho logical composition as well as consistency of the soil at different depths has been depicted in the respective bore logs BH-1 through BH-12.
- We have enclosed the allowable bearing capacity of soil for individual column capacity through Table 1.1 to Table 1.3 & RCC Cast-in-situ pile for different depth and diameter respectively with this report through Table- 2.1 to Table-3.12. Pile Load Bearing Capacity should be confirmed by Load Test.
- Moreover considering the magnitude of the structure, the expert structural engineer will put his justice and experience to select the suitable type & depth of foundation.

For the precise recommendation, total load comes to the foundation is highly needed. This is not within the scope of this report.

Recommended by



Description: Recommendation for foundation is given based on 12 borehole data but no borehole layout is given in soil test report. Also, bore log data is provided only for 3 boreholes. The building engineer is required to submit the complete soil test report with all bore log data along with design report to the RSC.

Observation-3: Lack of foundation information of mezzanine floor (Production Building-5).



Description: Foundation information is not provided for the mezzanine floor on the ground floor. The building engineer is required to verify the onsite foundation system, produce the complete as-built drawing, and submit the documents to the RSC along with the design report.

Observation-7: Loose cable bracing at rooftop steel shed (Production Building-5).



Description: Loose cable bracing was found at roof shed. The building engineer is required to identify the locations and tighten all the loose bracings.

Observation-8: Dampness on brick wall (Production Building-5).



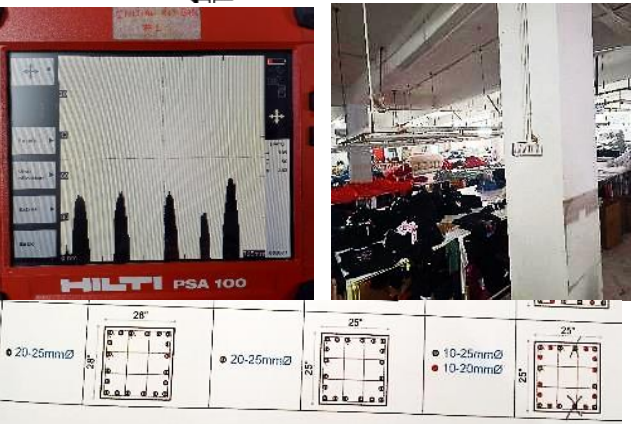
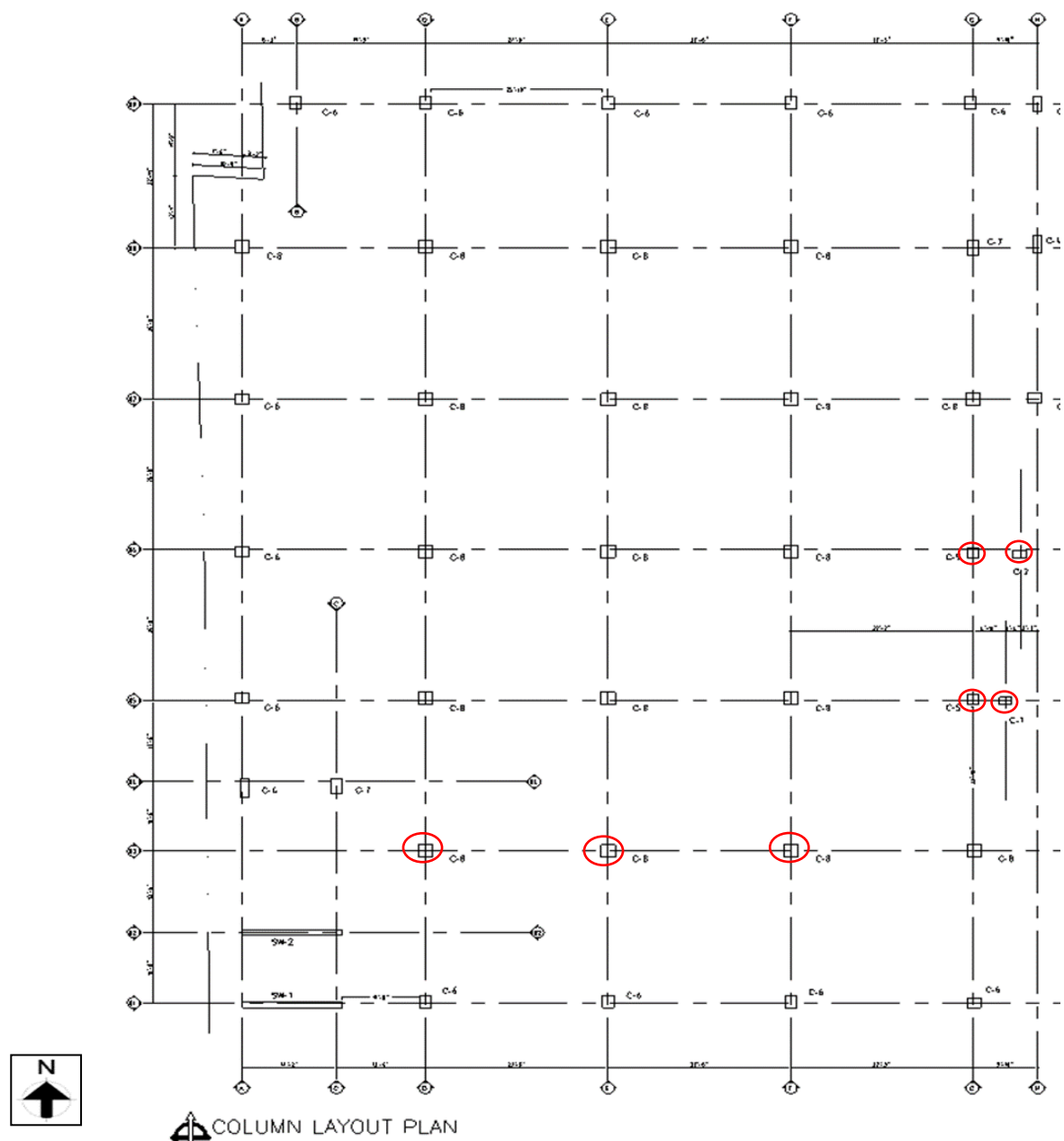
Description: Dampness was found on brick wall. The building engineer is required to repair dampness with a suitable method.

Observation-9: Nonstructural elements not anchored/braced (Production Building-5).

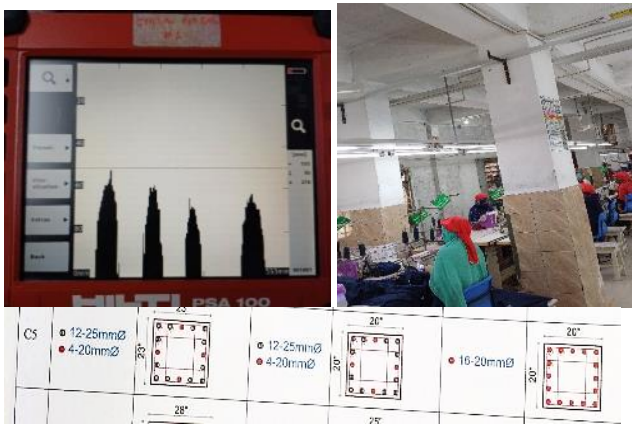


Description: Nonstructural elements were found not anchored/braced. The building engineer is required to anchored/braced all nonstructural elements within the factory.

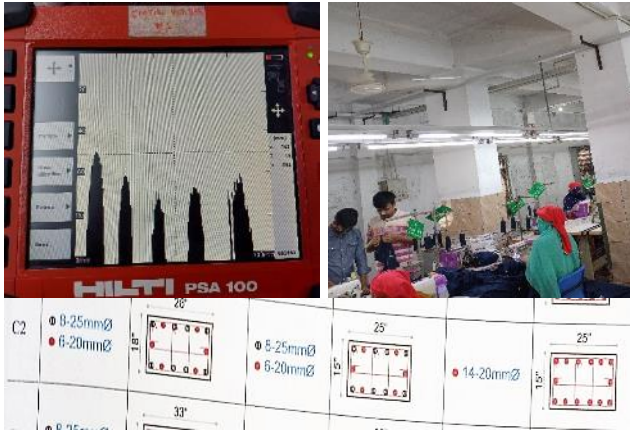
Observation-10: Lack of information and discrepancies in the provided drawing (Production Building-6).



Column C8 (625X625) re-bar profile found by scanning 6/5 (18 no's) instead of 6/6 (20 no's)



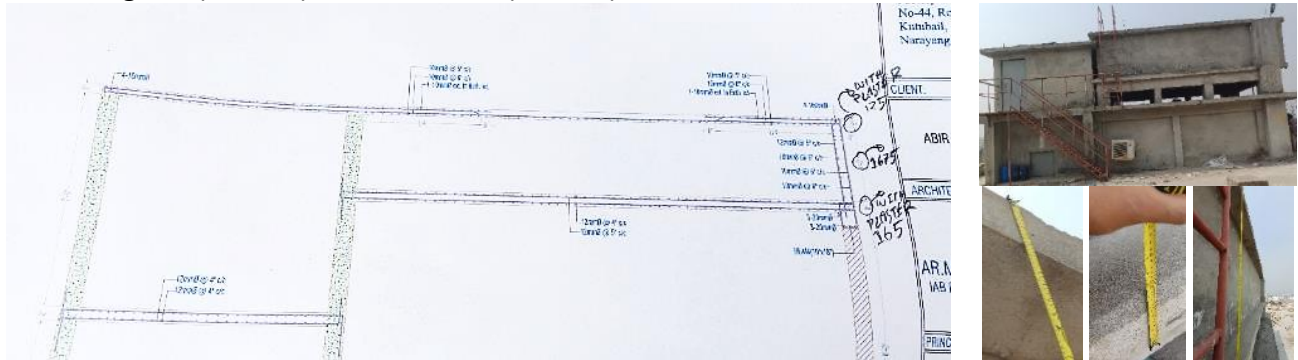
Column C5 (500X500) re-bar profile found by scanning 4/5 (14 no's) instead of 5/5 (16 no's)



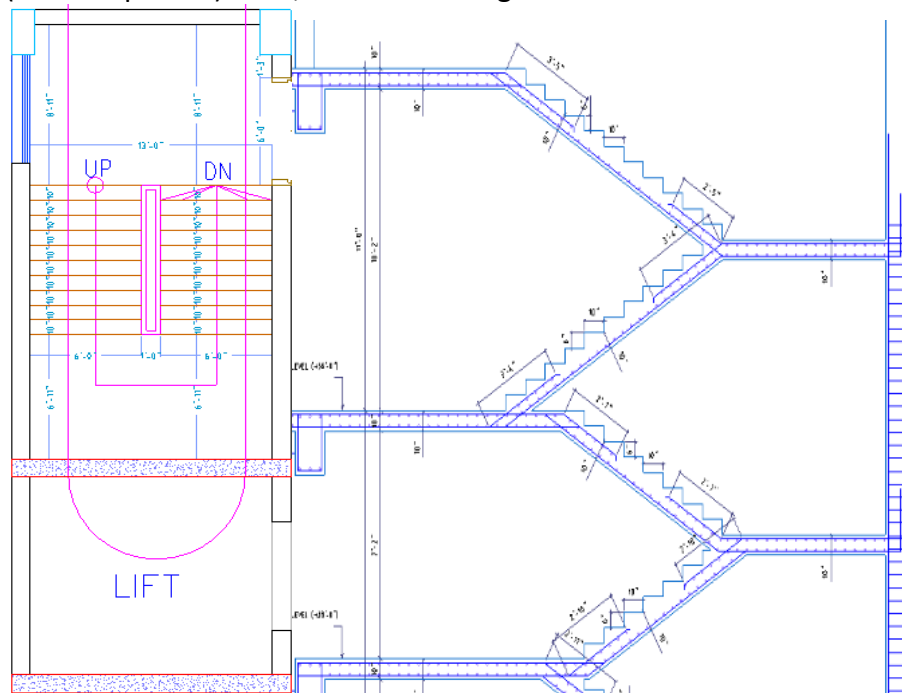
Column C2 (625X375) re-bar profile found by scanning 5/3 (12 no's) instead of 6/3 (14 no's)



Column C1 (375X500) re-bar profile found by scanning 4/3 (10 no's) instead of 5/3 (12 no's)



RC OHWT: Bottom slab thickness found 165mm (with both side plaster) instead of 200mm (without plaster) as well as top slab thickness found 125mm (with both side plaster) instead of 125mm (without plaster). Also, water tank height observed 1800mm instead of 1325mm.



South Stair: numbers of tread, height of riser, and landing width are mismatching with provided drawing





Tin Shed Extension at North Side which is not incorporated in the drawing.



North Stair: no detailing is available in the provided drawing.

Description: During the inspection, discrepancies were observed between the provided drawing and on-site conditions. RC column re-bar profile, OHWT detailing, and stair detailing mismatches were observed. Also, no information was available for the ground floor extended shed and the north staircase. The building engineer is required to survey the whole structure and update the drawing reflecting on-site condition.

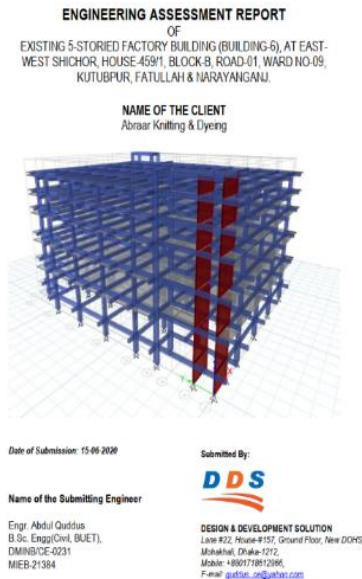
Observation-11: Lack of material test report (Production Building-6).

Sl. No.	Test	Result	Remarks	Remarks	Remarks
1	Compressive Strength	25.00 MPa	25.00 MPa	25.00 MPa	25.00 MPa
2	Split Tensile Strength	2.50 MPa	2.50 MPa	2.50 MPa	2.50 MPa
3	Modulus of Elasticity	25.00 GPa	25.00 GPa	25.00 GPa	25.00 GPa

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3	Modulus of Elasticity	25.00 GPa	25.00 GPa	25.00 GPa	25.00 GPa

Description: During the inspection, 02 sets of cylinder test report (column=1 and beam-slab=1) were provided which doesn't meet the frequency of testing requirements as per BNBC (Part VI, Chapter 5.12). The building engineer is required to verify in-situ material strength by further testing (minimum four concrete cores from lower tier building columns). Submit the test report and necessary calculations along with design report to the RSC.

Observation-12: Lack of information in the design report (Production Building-6).



Description: In the provided design report, adequacy check of ground floor extended shed and steel supported mezzanine floor is not included. Also, RC beam demand-capacity ratio, foundation punching, deflection & displacement and other vertical & horizontal irregularity checks were not incorporated in the report. Based on the in-situ material strength, update the structural analysis & design of the structures, and submit design documents to the RSC for review.

Observation-13: Prepared load plan to be revised (Production Building-6).

INDUSTRIAL, STORAGE & HAZARDOUS (Occupancy - G, H & J)	Workshop, factory, warehouse	1 Light workroom without storage	3.0	2.7
		2 Machinery hall & circulation area	4.0	4.5
		3 Factory, workshop etc.	5.0	4.5
		4 Manufacturing : light	6.0	4.5 ^(S)
		heavy	12.0	9.0 ^(S)
		ice	15.0	9.0 ^(S)
		5 Printing plant :		
		Press room	7.0	11.0 ^(S)
		Composing and linotype room	5.0	9.0 ^(S)
		Paper storage room	12.0	9.0 ^(S)
		6 Motor room, fan room etc. including the weight of machinery	7.5	4.5
		7 Cold storage, grain storage	15.0	9.0 ^(S)
		8 Storage warehouses : light	6.0	4.5 ^(S)
		heavy	12.0	9.0
		9 Foundries	20.0	12.0



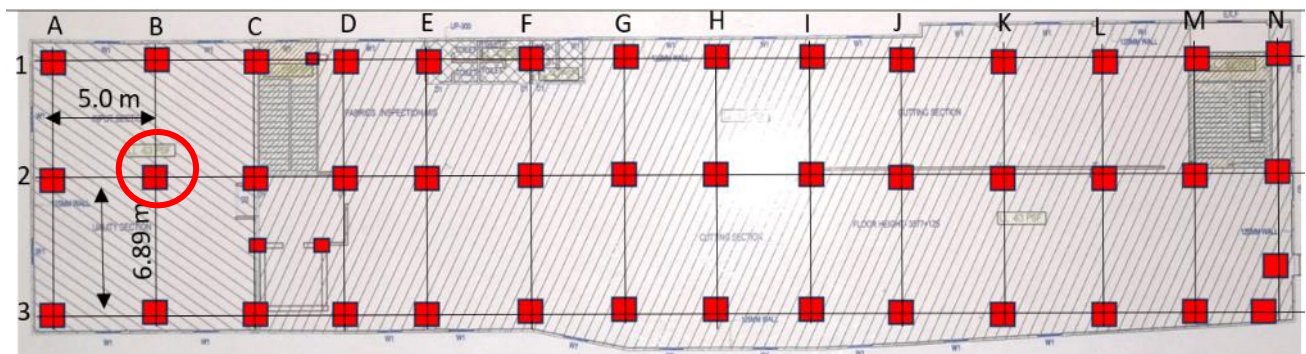
Description: This Building was constructed between May 2017 and August 2019 confirmed by factory management. However, typical live load considered as 5 Kpa in all floors. As per BNBC- Part 6, live load for light storage area is required to be considered minimum 6 kPa. The building engineer is required to revise the load plan as per BNBC requirement and submit the revised design documents to RSC for review.

Observation-14: Anchorage missing for the non-structural elements (Production Building-6).



Description: During the inspection, storage racks were observed on the several floors and locations without anchorage. The non-structural elements suspended from, attached to, or resting atop the structure shall be adequately anchored and braced to resist earthquake forces. The factory is required to brace/anchor all non-structural elements.

Observation-15: High stress in RC column. (Production Building-7)



Column Layout Plan



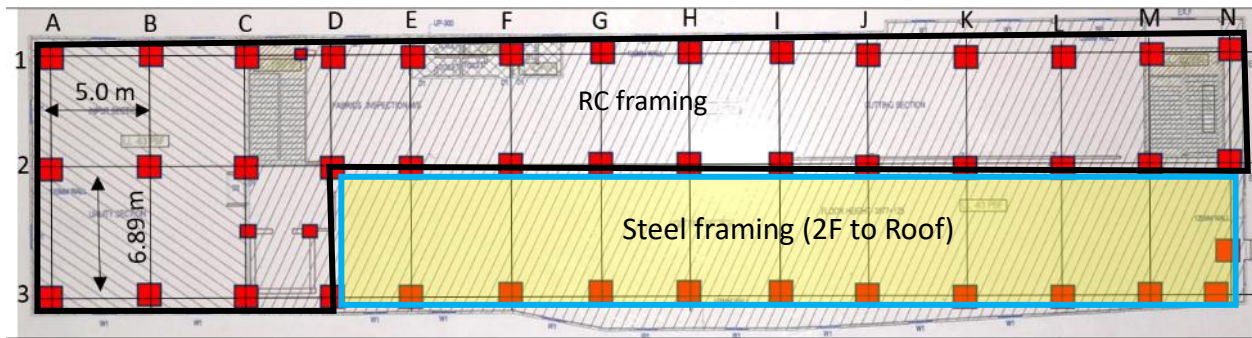
Storage area



Stressed RC column

Description: Cursory calculation indicates that the marked columns appear to be stressed above normal design limits based on 6 kPa floor live load with minimum concrete strength (16.3 MPa) based on aggregate type. Also, due to lack of drawing, foundation adequacy check was not verified. The building engineer is required to carry out Detail Engineering Assessment (DEA) to review the design, loads and column & foundation stress based on in-situ material strength and soil bearing capacity.

Observation-16: Different and irregular structural framing system. (Production Building-7)



Building Plan



RC framing systme



Steel framing systme

Description: The building consists of both RC & steel framing system where the shape of the RC framing is horizontally irregular. The irregular shape induces torsion into the structure. Also, the structural integrity of the structure is questionable. The building engineer is required to check the framing system, all types of irregularities & structural integrity of the structure. Incorporate the above issues in the software-based analysis model & revise the design report accordingly.

Observation-17: Lack of as-built drawing. (Production Building-7)



Description: During inspection, no architectural and structural drawing was found on site for Production Building -7. The building engineer is required to survey the full structure and produce accurate as-built drawing.

Observation-18: Lack of load management. (Production Building-7).



Storage on different floors

Description: During inspection, proper load management program was not observed. The building is being used for storage on the 2nd floor to 5th floor. The building engineer is required to produce and actively manage a loading plan for all floor plates within the factory considering floor, column, and foundation capacity.

Observation-19: Gap between steel connection plates. (Production Building-7)



Description: Connection gap between steel connection plates of steel beam and column was found in several locations. The building engineer is required to fill all the steel connection gap with suitable method.

Observation-20: Corrosion on steel member. (Production Building-7)



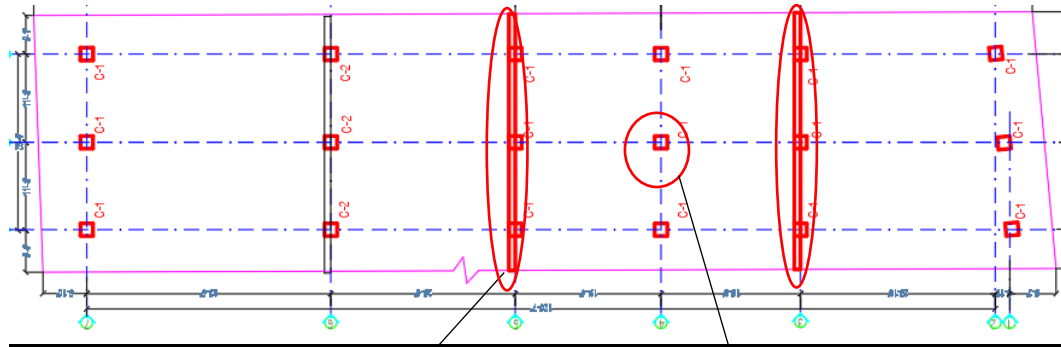
Description: Corrosion was found on steel members. The building is required to identify all corroded member, remove the corrosion, and apply suitable anti-corrosive coating to the affected steel members.

Observation-21: Missing bolt at steel connection. (Production Building-7)



Description: The building is required to identify all missing bolts and install adequate bolts.

Observation-22: Mismatch in structural drawing. (Utility Building)



Missing share wall



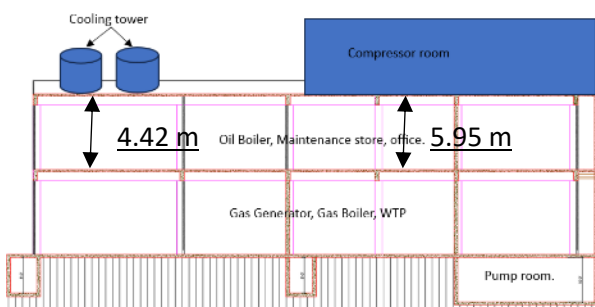
Missing RC column.



Undocumented roof top shed



Apparently non engineered roof shed



Different floor heights



Height=5.95 m



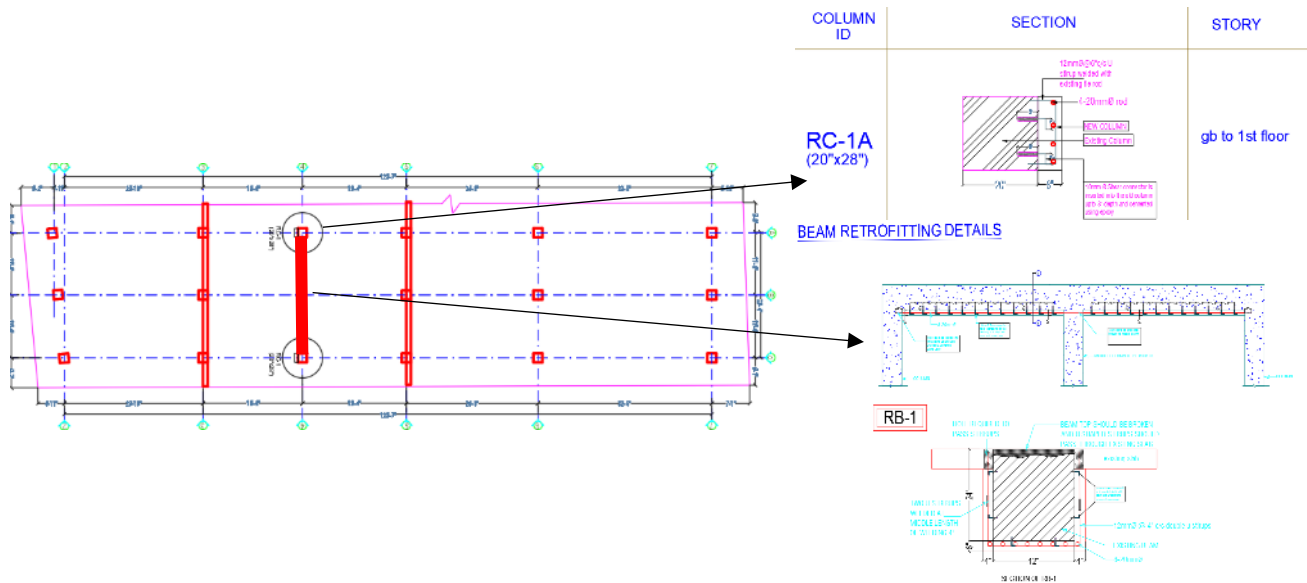
Height=4.42 m

Description: Mismatch was found between drawing and onsite condition.

- A RC column and two nos share wall (Marked above) were found missing onsite, which was shown in drawing.
- An undocumented apparently non engineered roof shed was found at roof.
- Floor level was different at 2nd floor, which was not shown in drawing.

The Building engineer is required to survey the whole structure and update the as-built drawings and perform Engineering Assessment (EA).

Observation-23: Retrofitting documents needs to be reviewed. (Utility Building)



Description: Two columns and a beam have been retrofitted for the Utility building. The building engineer is required to submit the DEA documents to the RSC for further review to justify the capacity of foundation, column, and beam & slab against the lateral & vertical loading.

Observation-24: Apparently non-engineered shed (Shed-2).



Apparently non-engineered shed: steel roof supported by RC, steel and bamboo columns

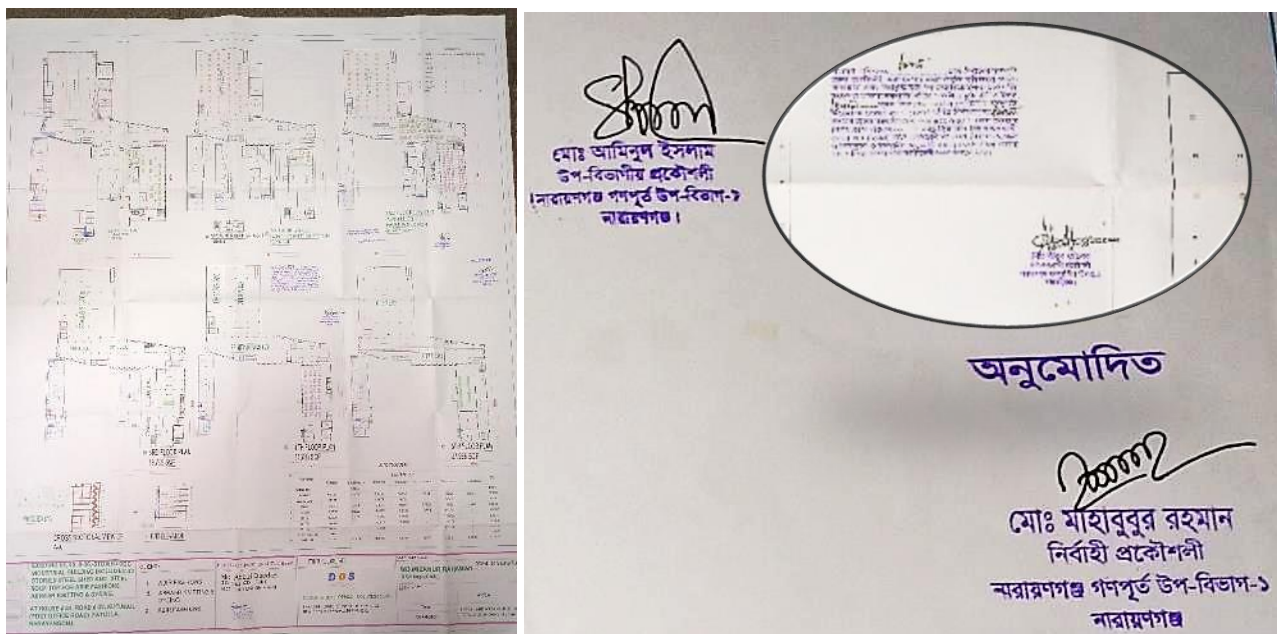
Description: During the inspection, an apparently non-engineered steel shed was observed where the stability system, member size and connections were inadequate. The building engineer is required to check the structural system, member size and connection of the structure and provide necessary alternatives.

Observation-25: Lack of information in the soil test report (All structure).

CLIENT : ABIR FASHION REPORT ON SUB-SOIL INVESTIGATION FOR THE CONSTRUCTION OF "H-STORIED FACTORY BUILDING" AT DAKSHIN SHACHAR, SHIBU MARKET, FATULLA, NARAYANGANJ. FEBRUARY : 2016 Prepared by: PRIME ENGINEERS Office: ATKSHA SHOPPING COMPLEX ROOM NO-10/11 ST FLOOR 88, NEW CIRCULAR ROAD BEALACHAR MOOR, DAKSHA MOBILE : 01750-339975, 01718-235551	CLIENT : ABIR FASHION OWNER : DR. TARIQ UDDIN AHMED REPORT ON: SUB-SOIL INVESTIGATION FOR THE CONSTRUCTION OF PROPOSED 06 (SIX) STORED FACTORY BUILDING AT MOZA- SHACHAR, 11 NO. C-5-155, S.A-13, R.S-08, DAG NO. C.S R S.A-290, R.S-739, 740, KHATIAN NO. C.S-17, S.A-08, R.S-06, NARJARI-5219, R.S 10TH NO.- 5218, HOUSE NO.-94, ROAD NO-2, VILL-KUTUBAIL, P.S-FATULLAH, DIST.- NARAYANGANJ, BANGLADESH. MAY : 2017 SUB-SOIL INVESTIGATION & REPORT PREPARED BY: RUPALI SOIL & ENGINEERS RUPALI CHAKRA, DAKSHIN, NARAYANGANJ, BANGLADESH TEL: 01712-801625 REPORT PREPARED BY: INNOVATIVE ENGINEERSA RUPALI CHAKRA, DAKSHIN, NARAYANGANJ, BANGLADESH TEL: 01712-801625
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Description: In the provided geotechnical investigation, borehole layouts are found missing. The building engineer is required to revise the geotechnical investigation report as per BNBC part-VI chapter-3 requirement.

Observation-26: Lack of authentication in the permit drawing (All structure).



Description: The provided permit drawing was approved and signed by Executive Engineer, PWD Sub-Division-1, Narayanganj. But no date was mentioned in the approval sign. The building engineer is required to authenticate the permit drawing with valid date and sign.

3. Action Plan:

Observation	Action Plan	Timeline
Production Building-5		
Inadequate number of concrete cylinder test report (Production Building-5).	The building engineer is required to take adequate number of cores from lower level to justify the design strength.	within 6 weeks
Lack of information in soil test report (Production Building-5).	The building engineer is required to submit the complete soil test report with all bore log data along with the design report to RSC for review.	within 6 weeks
Lack of foundation information of mezzanine floor (Production Building-5).	The building engineer is required to verify the onsite foundation system, produce the complete as-built drawing, and submit the documents to the RSC along with the design report.	within 6 weeks
Load plan doesn't comply with BNBC (Production Building-5).	The building engineer is required to revise the design documents based on in-situ material strength, actual foundation system & soil bearing capacity, BNBC live loading requirement and submit the revised design documents to the RSC for review.	within 6 weeks
	Implement remediation work if required.	within 6 months
Corrosion on steel members at mezzanine floor (Production Building-5).	The building engineer is required to remove the corrosion, provide rust proof coating on steel members to protect from corrosion.	within 6 weeks
Lack of lateral stability of rooftop shed (Production Building-5).	The building engineer is required to check the lateral stability of the rooftop steel shed.	within 6 weeks
	Implement remediation work if required.	within 6 months
Loose cable bracing at roof shed (Production Building-5).	The building engineer is required to identify the locations and tighten all the loose bracings.	within 6 weeks
Dampness on brick wall (Production Building-5).	The building engineer is required to repair dampness with a suitable method.	within 6 weeks
Nonstructural elements not anchored/braced (Production Building-5).	The building engineer is required to anchored/braced all nonstructural elements within the factory.	within 6 months

Observation	Action Plan	Timeline
Production Building-6		
Lack of information and discrepancies in the provided drawing (Production Building-6).	The building engineer is required to survey the whole structure and revise as-built drawing reflecting the on-site condition.	within 6 weeks
Lack of material test report (Production Building-6)	The building engineer is required to verify in-situ material strength by further testing (minimum four concrete cores from lower tier building columns).	within 6 weeks
Lack of information in the design report (Production Building-6).	Based on the in-situ material strength, the building engineer is required to update the structural analysis & design of the structures and submit design documents to the RSC for review.	within 6 weeks
	Carry out remedial work where required.	within 6 months
Prepared load plan to be revised (Production Building-6)	The building engineer is required to revise the load plan as per BNBC requirement and submit the revised design documents to RSC.	within 6 weeks
Anchorage missing for the non-structural elements (Production Building-6)	The factory is required to brace/anchor all non-structural elements.	within 6 months

Observation	Action Plan	Timeline
Production Building-7		
Lack of as-built drawing. (Production Building-7)	The building engineer is required to survey the full structure and produce accurate as-built drawing.	within 6 weeks
High stress in RC column. (Production Building-7)	Verify in-situ concrete material strength by taking concrete cores from lower tier building columns. And verify in-situ MS plate strength by taking samples from existing building beam & columns.	Immediate
	The building engineer is required to carry out Detail Engineering Assessment (DEA) to review the design, loads and column stress based on in-situ material strength.	within 6 weeks
	Carry out remedial work where required.	within 6 months
Different and irregular structural framing system	The building engineer is required to check the framing system, all types of irregularities & structural integrity of the structure. Incorporate the above issues in the software-based analysis model & revise the design report accordingly.	within 6 weeks
	Carry out remedial work where required.	within 6 months
Lack of load management. (Production Building-7)	The building engineer is required to produce and actively manage a loading plan for all floor plates within the factory considering floor capacity and column capacity.	within 6 weeks
	Implement floor load plan.	within 6 months
Gap between connection plates. (Production Building-7)	The building engineer is required to fill all the steel connection gap with suitable method.	within 6 months
Corrosion on steel member. (Production Building-7)	The building is required to identify all corroded member, remove the corrosion, and apply suitable anti-corrosive coating to the affected steel members.	within 6 months
Missing bolt at connection plate. (Production Building-7).	The building is required to identify all missing bolts and install adequate number of bolts	within 6 months

Observation	Action Plan	Timeline
Utility Building		
Mismatch in structural drawing. (Utility Building).	The building engineer is required to survey the whole structure and update the as-built drawings and perform Detail Engineering Assessment (DEA).	within 6 weeks
	Implement remediation work if required.	within 6 weeks
Retrofitting documents needs to be reviewed. (Utility Building)	The building engineer is required to submit the Detail Engineering Assessment (DEA) documents to the RSC for further review to justify the capacity of foundation, column, and beam & slab against the lateral & vertical loading.	within 6 weeks
	Implement remediation work if required.	within 6 months
Shed-2		
Apparently non-engineered shed (Shed-2)	The building engineer is required to check the structural system, member size and connection of the structure and provide necessary alternatives.	within 6 weeks
	Carryout suggested remedial works; otherwise demolish the structure.	within 6 months
All Structure		
Lack of information in the geotechnical investigation report (All structure)	The building engineer is required to revise the geotechnical investigation report as per BNBC part-VI chapter-3 requirement; otherwise conduct new geotechnical investigation.	within 6 months
Lack of authentication in the permit drawing (All structure)	The building engineer is required to authenticate the permit drawing with valid date and sign.	within 6 months