

Gumti Textile Ltd.

Plot # 1163, Chandra, Shafipur opp. of Ansar Academy, Kaliakoir, Gazipur, Bangladesh
(24.029842, 90.266881)

20th December 2020 & 13th Jan 2021



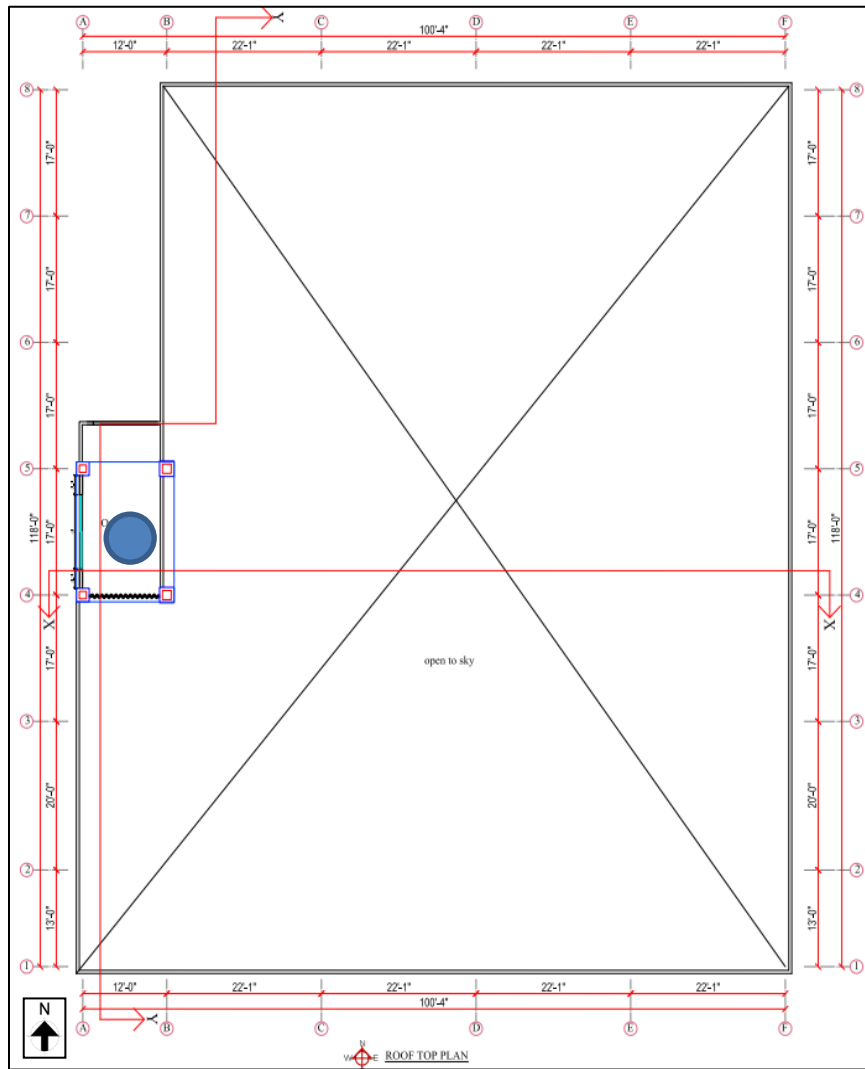
Buildings Information

1. Building A (G+Mz+4)
2. Building E (G+5)
3. Building B (G+5)
4. Shed C (single storied)
5. Utility building (G+1)
6. WTP Building (B+G+1)
7. Substation Building (G+1)
8. Security & RMS Building (single storied)
9. ETP Chemical Building (G+1)
10. Canteen (single storied)
11. Kitchen (single storied)
12. Mosque (single storied)

Observations

Discrepancies in as-built documents with onsite condition

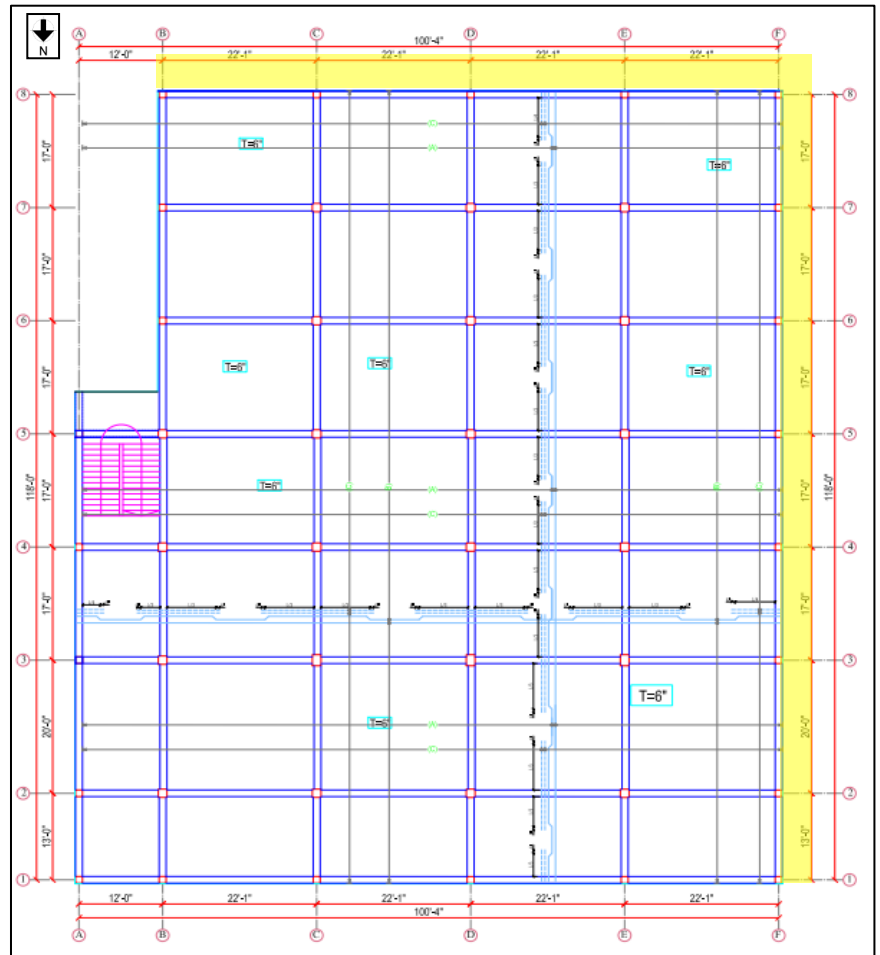
Observation: Building A



Roof layout

RCC water tank is shown on the drawing but on site there is one plastic water tanks on roof top having capacity of 3000 liters.

There is a slab cantilever area at south and west side that has not shown in the drawing. The width of the cantilever slab is approximately 600 mm.



Slab layout

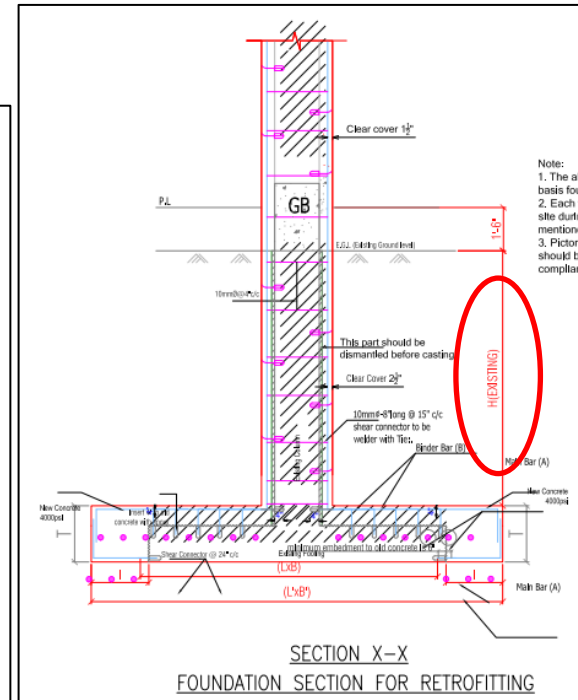
Design Report Needs to be Revised

Observation: Building A

II.A.) Check for Bearing & Punching for Footings

Grid ID (Arch/Struct.)	Col. Label (ETABS)	Column Section ID (Size below grade)	Service Load, P Kip	Ult. Load, P _u Kip	Foot ID	Foot Length, L ft	Foot Width, B ft	Col. Depth, d in.	Col. Width, b in.	Depth of Foot, d _f in.	Two-way Punching Check				Bearing Check				
											Punching Perimeter b ₀ in.	Punching Shear Stress, v _u psi	Punching Shear Stress Resistance, v _c psi	Punching Remarks	Soil Ult. B.C. q _u Ksf	Developed Stress q _d Ksf	FoS	FoS Remarks	
Concrete Specified Compressive Strength, f _c =								2028.9				Psi							
A/01	C1	C-01 (15"X15")B GB	54.84 6	79.62 7	F7	6	5	15	15	18	15	120	35.02	153.15	Punching safe	10.40	1.83	5.69	Bearing Safe
B/01	C2	C-01 (15"X15")B GB	128.2 9	189.7 19	F6	6	6	15	15	18	15	120	87.10	153.15	Punching safe	10.40	3.56	2.92	Bearing Safe
C/01	C3	C-01 (15"X15")B GB	161.0 6	238.6 38	F4	7	7	16	16	18	15	124	110.83	153.15	Punching safe	10.40	3.29	3.16	Bearing Safe
D/01	C4	C-01 (15"X15")B GB	156.6 4	232.0 19	F4	7	7	15	15	18	15	120	112.46	153.15	Punching safe	10.40	3.20	3.25	Bearing Safe
E/01	C5	C-01 (15"X15")B GB	164.5	243.7 78	F4	7	7	18	18	18	15	132	104.12	153.15	Punching safe	10.40	3.36	3.10	Bearing Safe

Foundation adequacy check



Retrofitted foundation section

The foundation depth in the structural drawing and retrofitting drawing is not specified. Thus, the govern value of the bearing capacity of soil is unknown. Also, the retrofitting material concrete test was mentioned to be 27.6 MPa, but there was no test report to confirm the strength of the retrofitted foundations.

The revision of DEA is required with provided the calculation of the foundation adequacy check for the retrofitted foundation that complies with the section 1.9.1.1 (part-6, BNBC).

Falling Hazard at Roof and Stair

Observation: Building E



Roof without any parapet wall

Various type of falling hazard and occupational health and safety hazard present in Building E. Factory engineer is required to identify the probable area and provide barriers to the unprotected edges.



Railing missing on stair



Lift core without closure

Column Susceptible to Impact Load on Ground Floor



Damaged column on ground floor of Building E, susceptible to impact load

Damaged column found on the ground floor of building E. The dimension of the column is slightly reduced after continuous impact by heavily loaded trolley. Damage was done by the movement of the loaded trolley. Factory management is required to provide barrier to hinder further damage to the column.

Absence of Design Documents

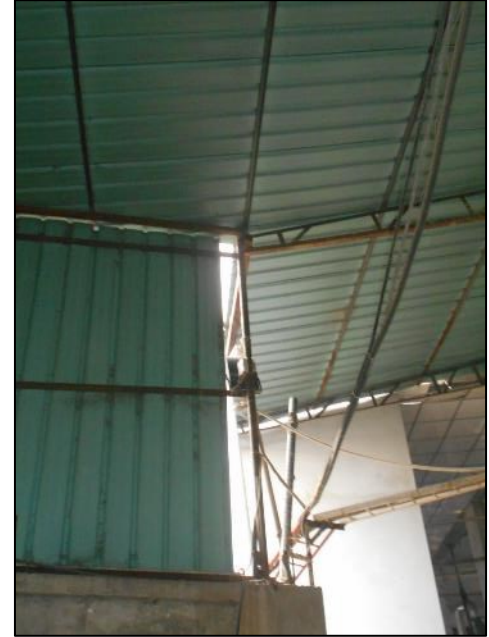
Observation: Building E



No design report was available for Building E

As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, only as-built drawing and geotechnical report were available, but no design report was available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

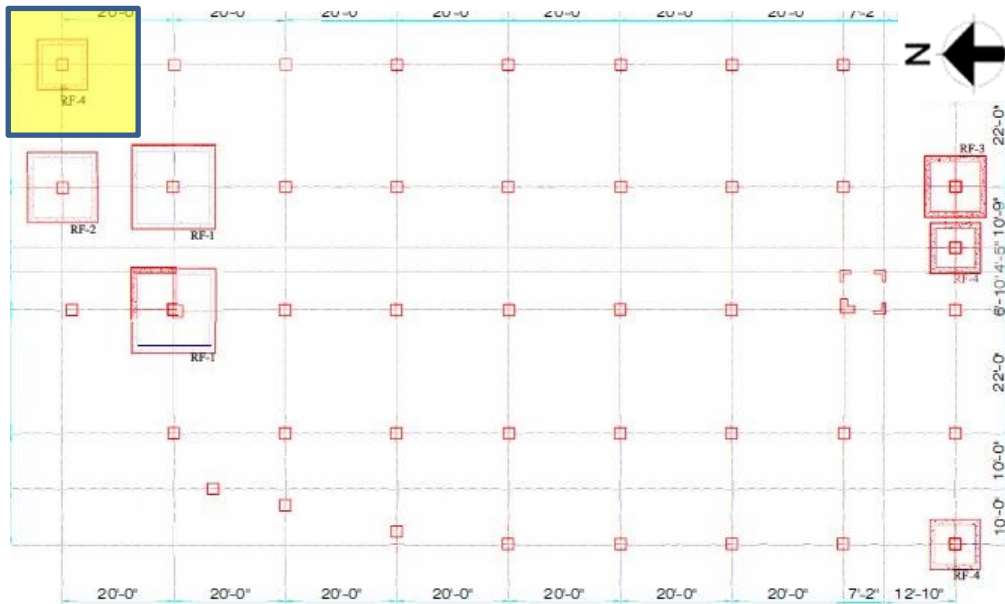
Absence of Drawing and Lateral Stability



Walkway shed among the corridor of Building A, Building E, Utility building and Shed C. Mostly improper connection found on site.

No defined structural system is present on this walk way shed. The connection type is welded. No drawing was available for this non-engineered shed.

Stress in foundation exceeds normal design limit



Retrofitting Foundation layout

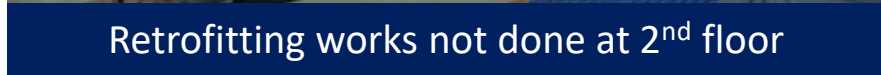
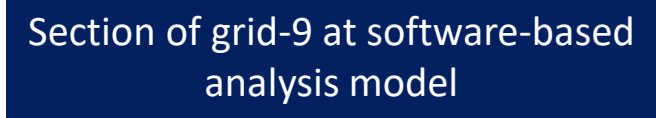
Grid No.	Footing Type	Existing Footing Information			Retrofitting Footing Information		
		Length (Ft.)	Breadth (Ft.)	Thickness T"	Length (Ft.)	Breadth (Ft.)	Thickness T"
01/A	F-04	7'-0"	7'-0"	15"	9'-0"	9'-0"	24"
01/F	F-04	7'-0"	7'-0"	15"	9'-0"	9'-0"	24"
01/G	F-03	9'-0"	9'-0"	18"	11'-0"	11'-0"	27"
01/H	F-04	7'-0"	7'-0"	15"	9'-0"	9'-0"	24"
09/D	F-01	13'-0"	13'-0"	31"	15'-0"	15'-0"	40"
09/G	F-01	13'-0"	13'-0"	31"	15'-0"	15'-0"	40"
10/G	F-02	10'-6"	10'-6"	24"	12'-6"	12'-6"	33"
10/H	F-04	7'-0"	7'-0"	15"	9'-0"	9'-0"	24"

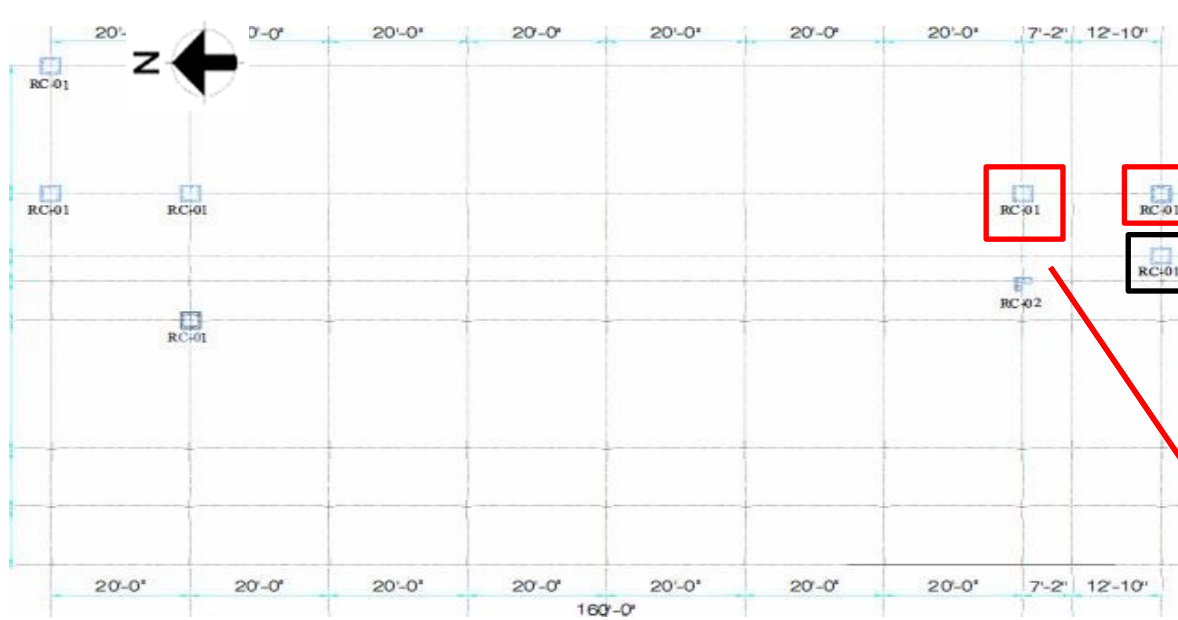
Footing schedule (existing & retrofitting)

Cursory calculation indicates that the stress in foundation exceeds normal design limit. This footing is situated at the stair area and live load for this footing is considered as 4 kPa as per provided load plan.

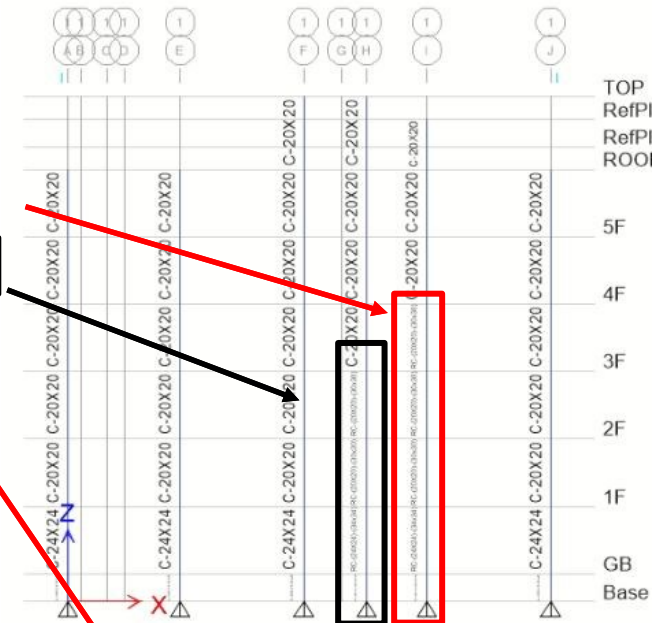
Dimension of this highlighted footing was initially 2.13m X2.13m and dimension became 2.74mX2.74m eventually after the retrofitting work carried out for this footing. However, considering 4 kPa live load and all source of dead load this footing has been found stressed in excess of normal design limit against the soil bearing capacity available from Geotechnical investigation report. Building engineer is required to carryout foundation adequacy check to justify the load carrying capacity.

**Proposed retrofit strengthening not properly
implemented**





Retrofitting column layout



Section of grid-1 at FEA model

Highlighted red marked columns are considered as retrofitting up to 3rd floor roof in the design report & software-based analysis model but those columns were found retrofitted up to 2nd floor roof. Also, Highlighted black marked column is considered as retrofitting up to 2nd floor roof but those columns were found retrofitted up to 1st floor roof. Building engineer is required to review the strengthen scheme & carry out required strengthen works where necessary.



Section of grid-3 at FEA model



Retrofitted column

Factory has carried out some retrofitting works in columns and footing but record of material strength was not available for the retrofitted columns and footings . Building engineer is required to prepare the material test report and confirm the material strength of the retrofitting works.

Inconsistency in as-built drawing

Column Susceptible to Vehicle Impact

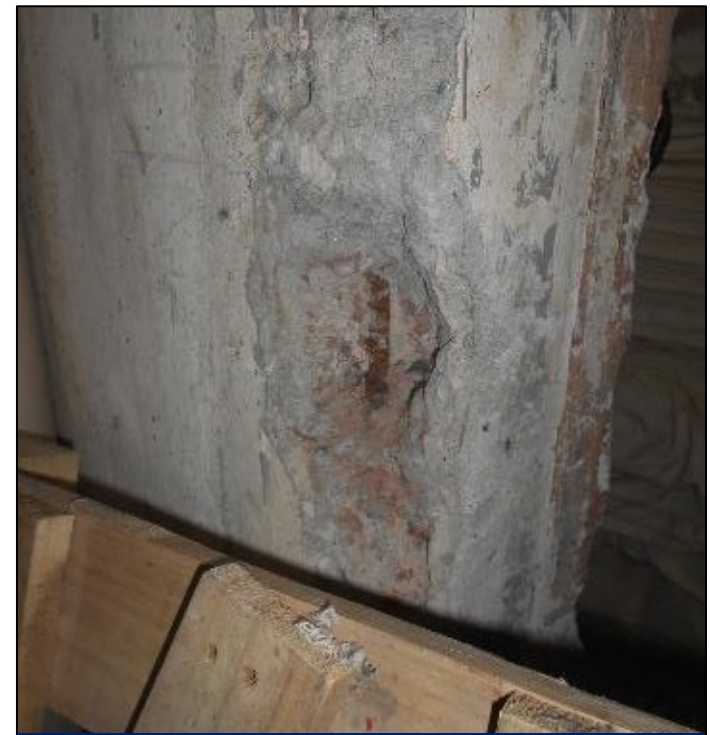


Columns were found adjacent to driveway and loading unloading platform which are susceptible to vehicle impact. Building engineer is required to take necessary measures to prevent the vehicle impact by providing the barrier around the columns.

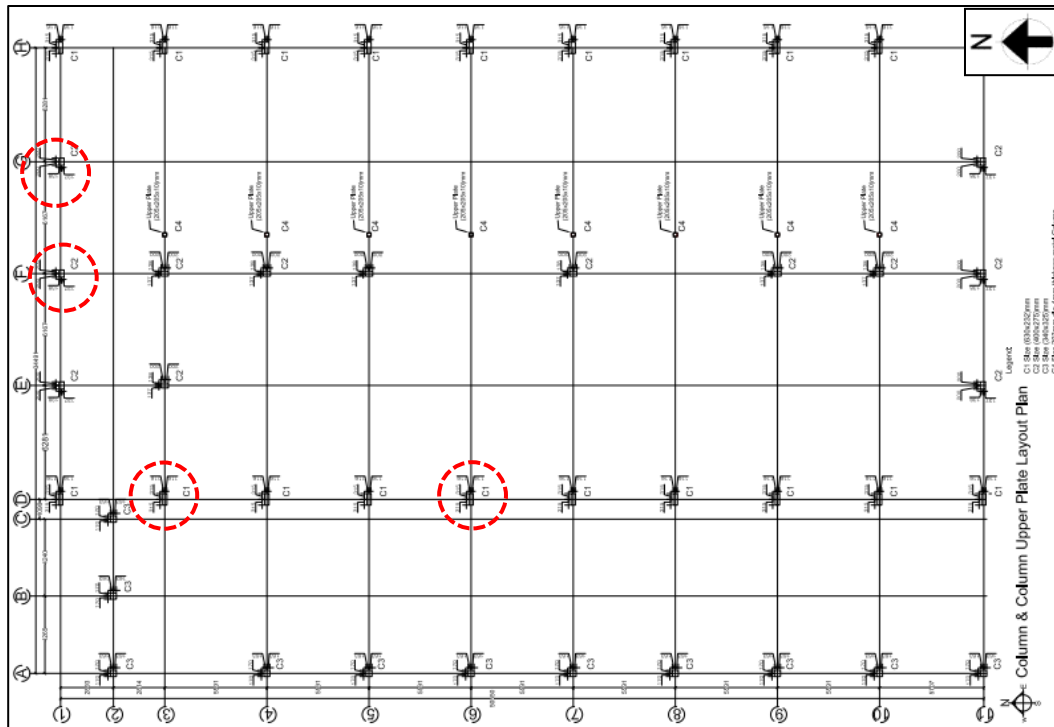
Appearance of Damaged Column and Corroded Rebar



Damaged column of Shed C



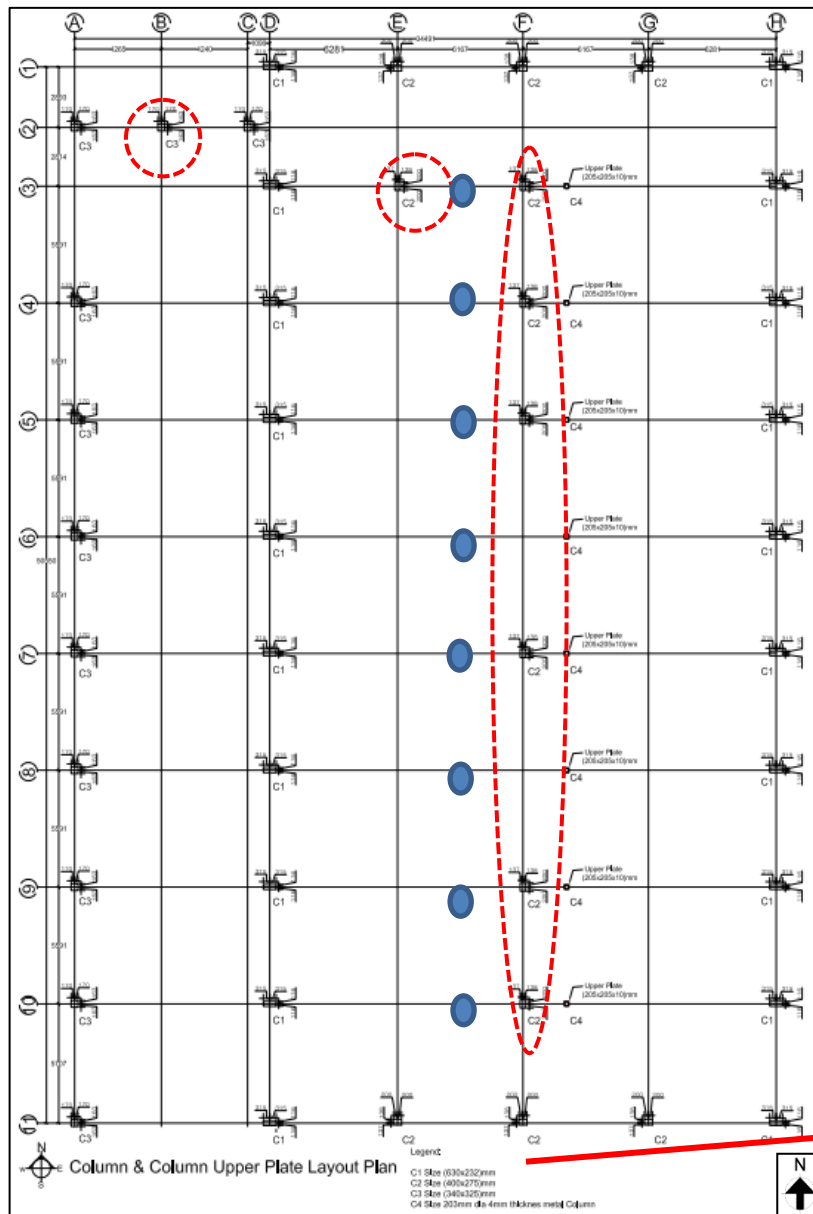
Corrode rebar in column



Column layout : Damaged column location

Sign of damage was found in the RCC column of shed C. Corroded rebar was also found exposed in some columns. Factory engineer is required take proper remedial works for the affected columns.

Discrepancies in as-built documents with onsite condition



- Steel column that has not been shown on the column layout
- RC columns are along with the Grid line A , C, D H, 1, 11.

Column layout does not match with site condition. The marked (red) columns were not observed during inspection. RC Column was not found on Grid B-2, E-3, F-3~10. Additionally steel column was found on the Grid F-3~10 which was of same dimension as C4 type column. The dimension of C1 type column was found 630 mm by 210 mm instead of 630 mm by 232 mm. The dimension of C3 type column was found 300 mm by 300 mm instead of 340 mm by 325 mm. The dimension of C4 type column was found 230 mm instead of 203 mm.

Legend:

C1 Size (630x232)mm
 C2 Size (400x275)mm
 C3 Size (340x325)mm
 C4 Size 203mm dia 4mm thickness metal Column

} RC columns

Column layout : marked (red) columns were not present

Steel pipe columns

Absence of Load Transfer Media and Design Documents



Connection of Truss to column (Grid D~H)

No vertical or horizontal bracing was found to transfer lateral load. Lateral load transfer system is not clear. Truss is not supported by steel column at node point. In addition, no design report was available on site. Building engineer is required to check the lateral stability of the shed.



Truss system (Grid A~D)

As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, only as-built drawing and geotechnical report were available, but no design report was available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

Discrepancies in as-built documents and Absence of Design Documents

Observation: Utility Building



No design report was available for Utility Building

As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, only as-built drawing and geotechnical report were available, but no design report was available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

Absence of documents as per BNBC

**Observation: WTP Building, ETP Chemical Building,
Substation Building**



WTP building



ETP Chemical building



Substation building

As per BNBC, every building or structure designed shall have its design documents prepared in accordance with the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC. At the time of inspection, only as-built drawing and geotechnical report were available, but no design report was available which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

**Observation: WTP Building, ETP Chemical Building,
Substation Building**

Priority Actions

Problems Observed

Building A:

Item 1: Discrepancies in as-built documents with onsite condition.

Item 2: Design Report Needs to be Revised.

Building E:

Item 3: Falling Hazard at Roof and Stair

Item 4: Column Susceptible to Impact Load on Ground Floor

Item 5: Absence of Design Documents

Walkway shed:

Item 6: Absence of Drawing and Lateral Stability

Building-B:

Item 7: Stress in foundation exceeds normal design limit

Item 8: Proposed retrofit strengthening not implemented.

Item 9: Inconsistency in as-built drawing.

Item 10: Column Susceptible to vehicle impact.

Shed-C:

Item 11: Appearance of Damaged Column and Corroded Rebar.

Item 12: Discrepancies in as-built documents with onsite condition .

Item 13: Absence of Load Transfer Media and Design Documents.

Utility Building:

Item 14: Discrepancies in as-built documents and Absence of Design Documents.

WTP Building, ETP Chemical Building, Substation Building:

Item 15: Absence of documents as per BNBC.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Discrepancies in as-built drawings with onsite condition (Building A)	Building Engineer is to survey the whole structure and update as-built drawings representing accurate site condition.	6-weeks
02	DEA report need to be revised (Building A)	Building Engineer to revise DEA report by reviewing design, loads and capacity of structural members & foundation.	6-weeks
03	DEA report need to be revised (Building A)	Produce and actively manage a loading plan for all floor plates within the factory, considering floor, column and foundation capacity.	6-weeks
04	DEA report need to be revised (Building A)	Complete implementation of any remedial works deemed necessary by the DEA.	6-months
05	DEA report need to be revised (Building A)	Continue to implement loading plan.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
06	Falling Hazard at Roof and Stair (Building E)	Provide barriers to the unprotected edges to nullify falling hazard.	Immediate - Now
07	Column Susceptible to Impact Load on Ground Floor (Building E)	The factory engineer is required to take necessary measures to repair the damage columns and to prevent the trolley impact by providing the barrier around the columns.	6-weeks
08	Absence of Design Documents (Building E)	Factory engineer is required to prepare the design documents including a design report, and a set of structural drawings in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC part 6 and submit to RSC for review.	6-weeks
09	Absence of Design Documents (Building E)	Verify and actively manage prepared load plan for all floors considering floor, column and foundation capacity.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
10	Absence of Design Documents (Building E)	Complete remedial works arising from design report after reviewed by RSC.	6-months
11	Absence of Design Documents (Building E)	Implement floor loading plan.	6-months
12	Absence of Drawing and Lateral Stability (Walkway shed)	Repair or demolish the apparently non-engineered walkway shed in an engineered way or demolish the structure.	6-months
13	Stress in foundation exceeds normal design limit (Building-B)	Building engineer is required to carryout foundation adequacy check to justify the load carrying capacity.	6-weeks
14	Stress in foundation exceeds normal design limit (Building-B)	Implement any remediation work if required.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
15	Proposed retrofit strengthening not properly implemented. (Building-B)	Building engineer is required to review the strengthen scheme & carry out required strengthen works where necessary.	6-weeks
16	Proposed retrofit strengthening not properly implemented. (Building-B)	Building Engineer to revise the Design report in compliance with section 1.9.1.1 as per BNBC to justify the existing retrofitting works.	6-weeks
17	Proposed retrofit strengthening not properly implemented. (Building-B)	Verify the material strength of the retrofitting section as per design strength.	6-weeks
18	Proposed retrofit strengthening not properly implemented. (Building-B)	Implement any remediation work if required.	6-months
19	Inconsistency in as-built drawing. (Building-B)	Building Engineer is to survey the whole structure and update as-built drawings representing accurate site condition.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
20	Column Susceptible to vehicle impact. (Building-B)	Building engineer is required to take necessary measures to prevent the vehicle impact by providing the barrier around the column.	6-weeks
21	Appearance of Damaged Column and Corroded Rebar (Shed C)	The factory engineer is required to take necessary measures to repair the damage columns and to prevent the trolley impact by providing the barrier around the columns.	Immediate - Now
22	Appearance of Damaged Column and Corroded Rebar (Shed C)	Building Engineer to investigate the cause of damage and continuous monitoring the status of the columns.	6-weeks
23	Appearance of Damaged Column and Corroded Rebar (Shed C)	Carry out any structural remedial works arising from review and investigation.	6-months
24	Discrepancies in as-built documents with onsite condition (Shed C)	Building Engineer is to survey the whole structure and update as-built drawings representing accurate site condition.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
25	Absence of Load Transfer Media and Design Documents (Shed C)	Building engineer is required to check the requirement of the any load transfer media or bracing system.	6-weeks
26	Absence of Load Transfer Media and Design Documents (Shed C)	Building Engineer to prepare design report as per BNBC (part-6; Article 1.9.1) by reviewing design, loads and capacity of structural members.	6-weeks
27	Absence of Load Transfer Media and Design Documents (Shed C)	Complete implementation of any remedial works deemed necessary by the Design Report.	6-months
28	Absence of Design Documents (Utility Building)	Building Engineer to prepare design report as per BNBC (part-6; Article 1.9.1) by reviewing design, loads and capacity of structural members.	6-weeks
29	Absence of Design Documents (Utility Building)	Complete implementation of any remedial works deemed necessary by the Design Report.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
30	Absence of documents as per BNBC. (WTP Building, ETP Chemical Building, Substation Building)	Building Engineer to prepare design report as per BNBC (part-6; Article 1.9.1) by reviewing design, loads and capacity of structural members.	6-weeks
31	Absence of documents as per BNBC. (WTP Building, ETP Chemical Building, Substation Building)	Complete implementation of any remedial works deemed necessary by the Design Report.	6-months