

Fakir Knitwears Ltd. (Extension)

Kayempur, Fatullah, Narayanganj

Geographic Coordinates: 23.63924, 90.50011

22 August 2023



Executive Summary

Building-4 (Generator Building): Three storied (G+2) building.

Building-7 (Chiller Tower): Two storied (G+1) RC building.

Building-9 (Old ETP Building): ETP with 2 storied (G+1) blower building

Building-10 (New ETP Building): ETP.

Shed-8 (Dyeing Color Lab): Single storied shed with mezzanine floor.

Shed-9 (New Dyeing Shed): Single storied shed.

Shed-10 (Old Dyeing Shed): Single storied shed.

Shed-11 (Boiler Shed): Single storied shed.

Shed-12 (Seinging Shed): Single storied shed.

Shed-13 (Acid Store): Single storied shed.

Shed-14 (Dyes Chemical Store): Single storied shed

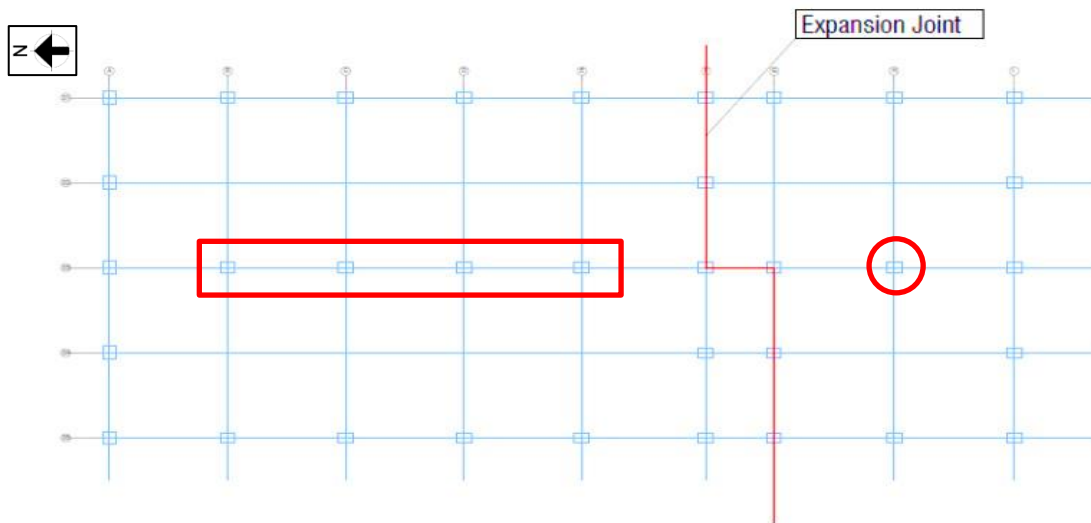
Shed-15 (ETP Sludge Store): Single storied steel shed.

Shed-16 (Printing Shed): Single storied shed.

Ancillary Structures: RMS-single storied building, Canteen Shed(single Storey), Smoking Zone Shed (single Storey), General Security Post (single Storey), Female Security Post (single Storey), Cycle Garage (single Storey), General Security Post Gate-1 (single Storey).

Observations

High stress in the column



Column layout plan

Cursory calculation indicates that the marked columns are highly stressed based on 3 kPa typical floor live load, and observed machinery loads with minimum concrete (14.1 MPa) and rebar strength (415 MPa). The source of loadings are chiller machine of the floors and cooling tower on the roof. 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, actual machinery loads and minimum floor live loads.



Source of loading: Chiller

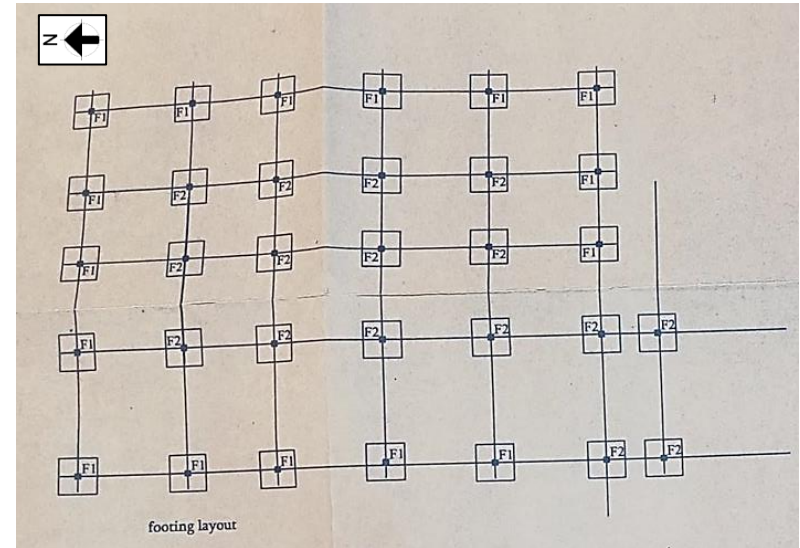


Source of loading:
Cooler

Lack of foundation details



Building-4

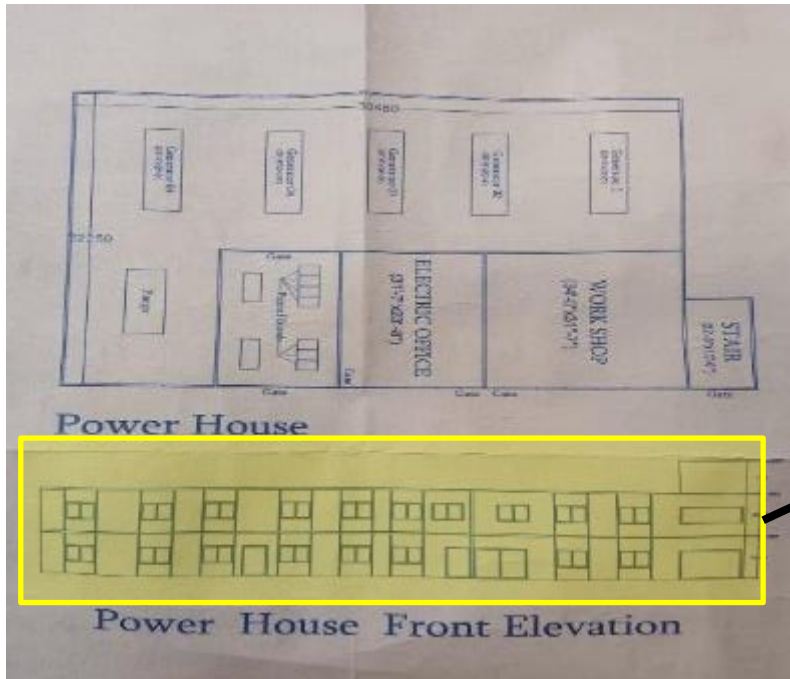


Footing layout (Old part)

Foundation layout drawing was available for the old part of the Building-4. But foundation size and other details were not available. In addition, geotechnical investigation report was not available for both part. However, as part of DEA, the building engineer is required to prepare as-built drawings for foundations with necessary details; carry out geotechnical investigation; check the foundation adequacy of the building and suggest proper remedial actions.

Structural System : Building-4 (Generator Building)

Vertical extension without approval drawing



Building Permit drawing: Proposed 2 storey



As-built construction of Building-4: 3 storey

Factory had a building permit drawing for proposed 2 storied Powerhouse Building (Building-4). However, the building was found as three storied. Also, the existing building plan and column layout doesn't reflect the permit drawing. The factory is required to collect revised building permit drawing for the structure from the local authority.

Corrosion in adjacent steel stair

Observation: Building-4 (Generator Building)



Corroded steel stair

Building Engineer is required to identify all corroded member, remove the corrosion and apply suitable anti-corrosive coating to the affected steel members.

Observation: Building-4 (Generator Building)

**Lack of lateral stability adjacent steel stair and
improper connection of steel platform**



Lack of load transfer media along east-west dir.



Discontinuity of top plate in beam-column joint

Due to absence of load transfer media and improper connections the lateral stability of the steel structure is questionable. The building engineer is required to check the lateral stability and connection adequacy of the steel structures.

Observation: Building-4 (Generator Building)

Dampness on wall and roof



Dampness on wall and roof

Dampness observed on wall and roof slab. The roof is constructed with brick aggregate concrete (MCAC). The building engineer is required to take necessary steps to repair the damp areas and apply water proofing layer on the roof with proper slope.

Vibration at all floors



Heavy machineries: source of vibration

Vibration was felt at all floors due to heavy machinery operating on floor slab. Building engineer is required to identify the actual cause of vibration, check the long-term effect on the structure and suggest suitable action to reduce the vibration.

Lack of design documents



Chiller Building

As per BNBC (part-6), every building or structures designed should have its design documents in accordance with section 1.9.1. During inspection, drawing and design report were not found on-site. The building engineer is required to prepare a set of design documents (including as-built drawings, floor load plan and design report based on in-situ material strength & software-based analysis) for the building following BNBC (part-6, section 1.9.1).

Observation: Building-7 (Chiller Building)

Heavy loading on roof



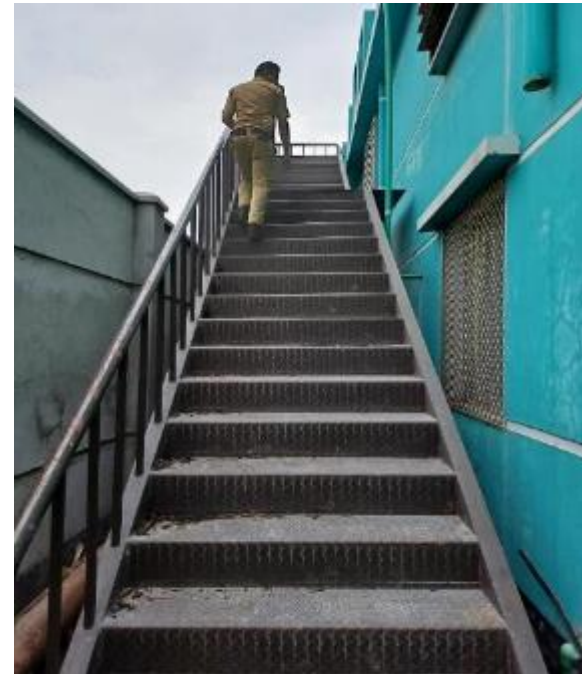
Heavy loading on roof

Building engineer is required to produce a floor load plan based on floor and column capacity of the building.

Lack of lateral stability of adjacent steel stair



No vertical bracing provide for the stair

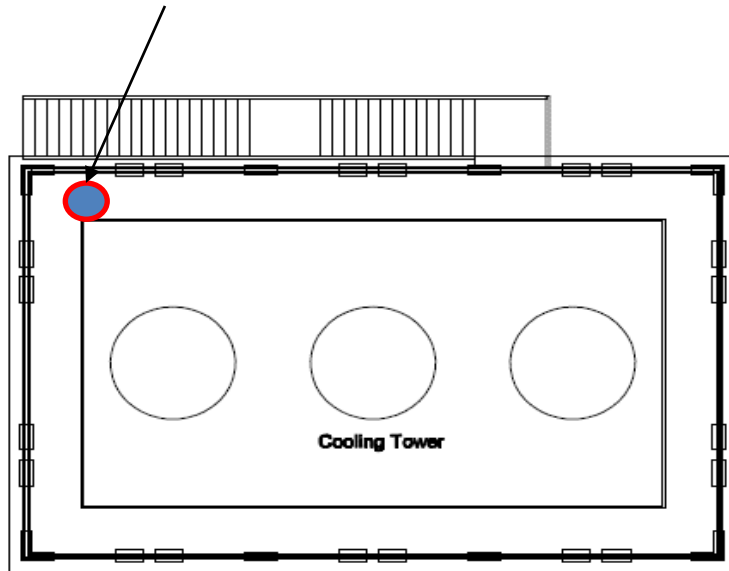


Long stringer beam

The steel stair was appeared to be unstable due to lack of vertical bracing. The building engineer is required to check the lateral stability of the steel stair and suggest remediation if required.

Discrepancies in as-built drawing

Plastic water tank



Roof Top Plan

Roof layout plan: Plastic water tank not shown



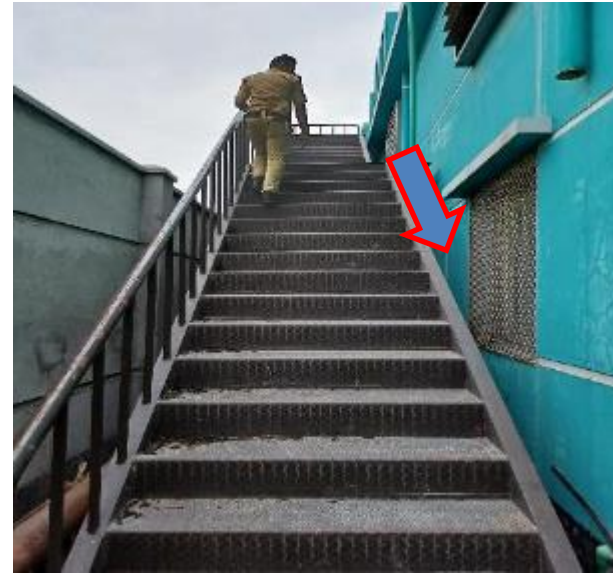
Plastic water tank on the roof

Plastic water tank was not shown in architectural drawing. Building engineer is required to revise the drawings as per site condition.

Falling hazard at roof and adjacent steel stair



Discontinuous parapet on roof



Lack of railing in stair

Building engineer is required to add barrier for open area to prevent falling hazard for both roof and adjacent steel stair.

Lack of design documents for blower building



As per BNBC (part-6), every building or structures designed shall have its design documents in accordance with the provision of section 1.9.1. During inspection, proper design documents were not found on-site. The building engineer is required to prepare a set of design documents (including as-built drawings, floor load plan and design report based on in-situ material strength & software-based analysis) for the building following BNBC (part-6, section 1.9.1).

Falling hazard at Old ETP



Huge gap between newel/balusters



Lack of railing and falling hazard screening area

Building engineer is required to provide additional newel post and balusters to the railing to prevent possible falling hazard.

Observation: Building-9 (Old ETP Building)

**Lack of as-built drawings & design documents for
the steel roof system**



New ETP roof structure

As per BNBC (part-6), every building or structures designed shall have its design documents in accordance with the provision of section 1.9.1. During inspection, proper design documents were not found on-site. The building engineer is required to prepare a set of design documents (including as-built drawing and design report based on in-situ material strength & software-based analysis) for the roof structure following BNBC (part-6, section 1.9.1).

Observation: Building 10 (New ETP Building)

Inadequate railing at New ETP



Huge gap between newel/balusters

Building engineer is required to provide additional newel post and balusters to the railing to prevent possible falling hazard.

Lack of lateral stability



No vertical bracing/compression member provided

Only roof bracing is provided for the roof and load transfer media is not provided from frame to frame to transfer the lateral load. Also, no vertical bracing is provided for the shed. Hence, lateral stability system is structure is incomplete. The building engineer is required to check the lateral stability of the structure as part of EA and suggest proper remedial actions accordingly.

Crack on wall at several locations



Crack on wall at several locations

During inspection, crack was observed on mezzanine floor walls and stair landing wall. The factory is required to identify the reason of the cracks and repair as per guidance by the building engineer.

Observation: Shed-8 (Dyeing Colour Lab)

Falling hazard

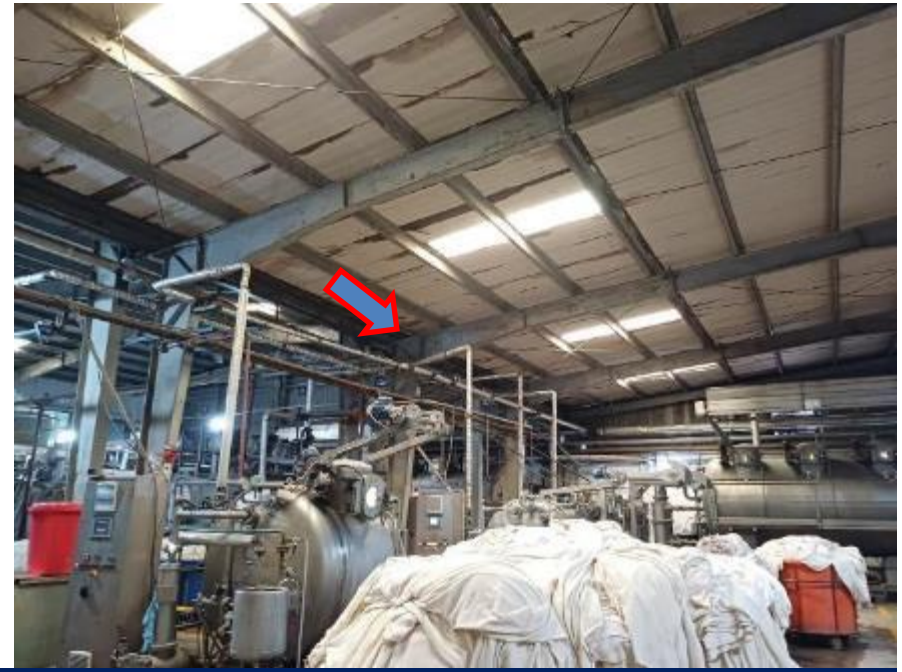
Observation: Shed-8 (Dyeing Colour Lab)



Falling hazard at mezzanine floor due to low height masonry wall

During inspection low height masonry wall found at the window area. The factory is required to provide adequate protection to avoid falling hazard.

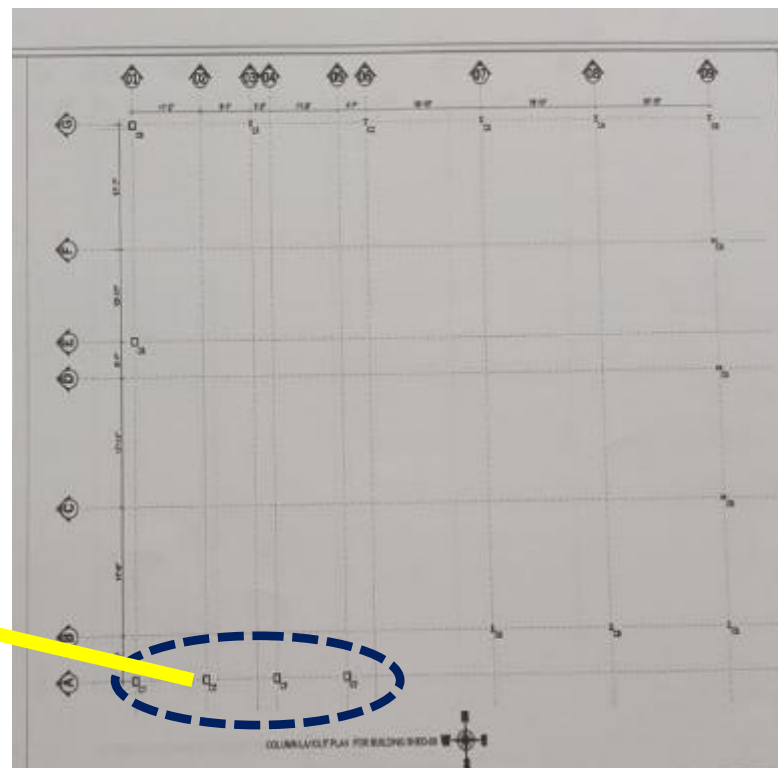
Lack of lateral stability



No vertical bracing/compression member provided

Only roof bracing is provided for the roof and load transfer media is not provided from frame to frame to transfer the lateral load. Also, no vertical bracing is provided for the shed. Hence, lateral stability system is structure is incomplete. The building engineer is required to check the lateral stability of the structure as part of EA and suggest proper remedial actions accordingly.

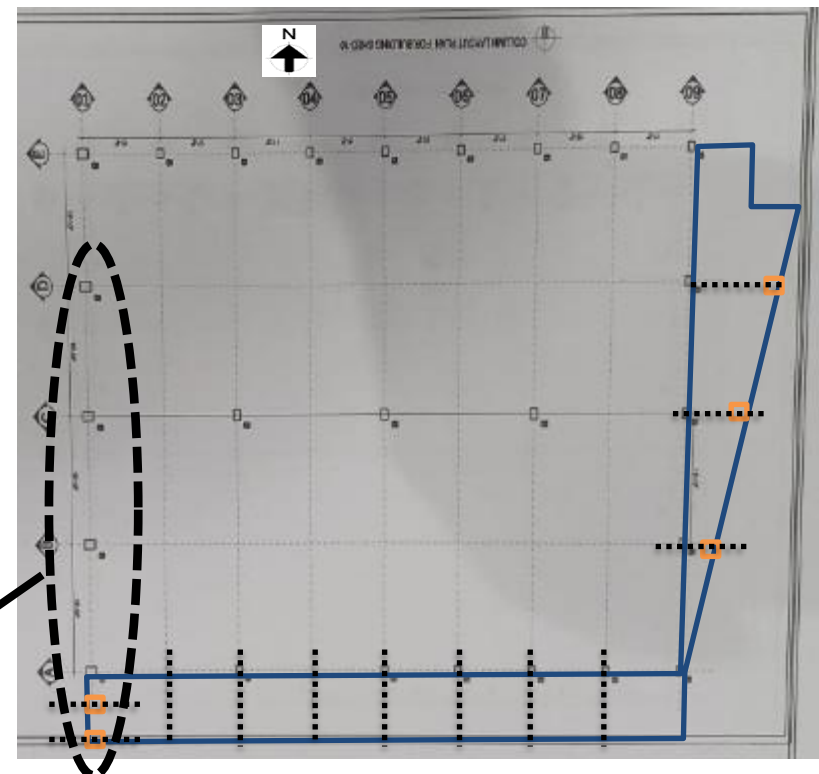
Structural connection between Shed-9 & Shed-10



Connected portion of shed-9 with shed-10: The RC column is common for both sheds

Structural connection was observed between shed-9 and shed-10 which was not shown in drawing. Steel rafters of Shed-9 are resting on steel jack beam which is supported by a corbel of common RC column shared by both Shed-9 and Shed-10. Building engineer is required to either separate the structures or analyze the two structures as one.

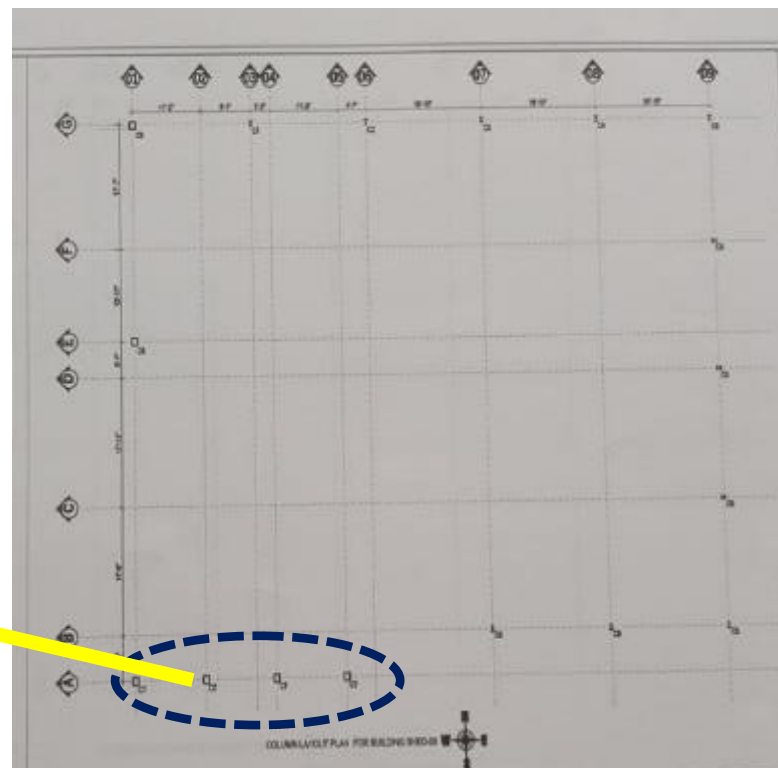
Structural connection of Shed-10 with adjacent Shed-3 & Shed-9



Floor layout of shed-10

During inspection connection between shed-3 and shed-10 observed which was not shown in the drawing. Steel truss of Shed-10 connected with RC column of Shed-3. The building engineer is required to survey the structures and update the as-built drawing with structural connection details. Also, revise the design documents considering structural connection of the structures.

Observation: Shed-10 (Old Dyeing Shed)



Connected portion of shed-9 with shed-10: The RC column is common for both sheds

During inspection connection between shed-9 and shed-10 observed which was not shown in the drawing. Steel rafter of Shed-9 rested steel jack beam which is supported by corbel of common RC column. The building engineer is required to survey the structures and update the as-built drawing with structural connection details. Also, revise the design documents considering structural connection of the structures.

Observation: Shed-10 (Old Dyeing Shed)

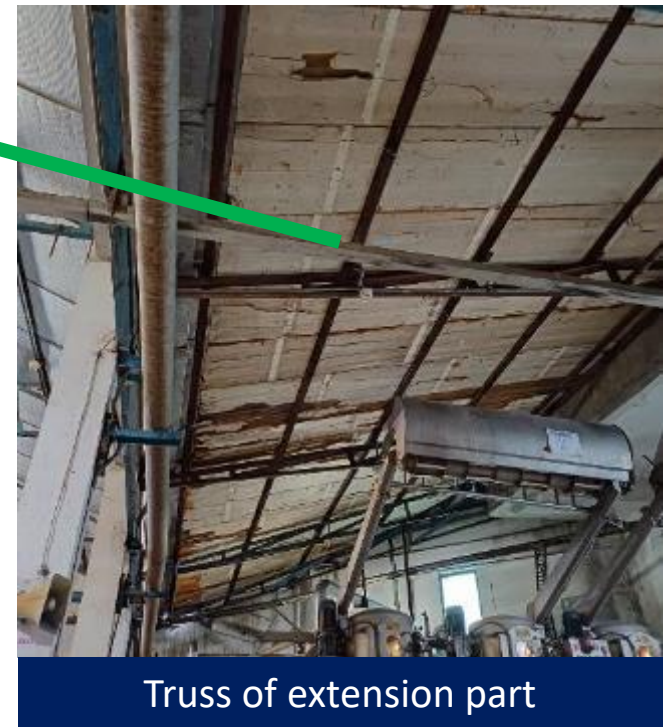
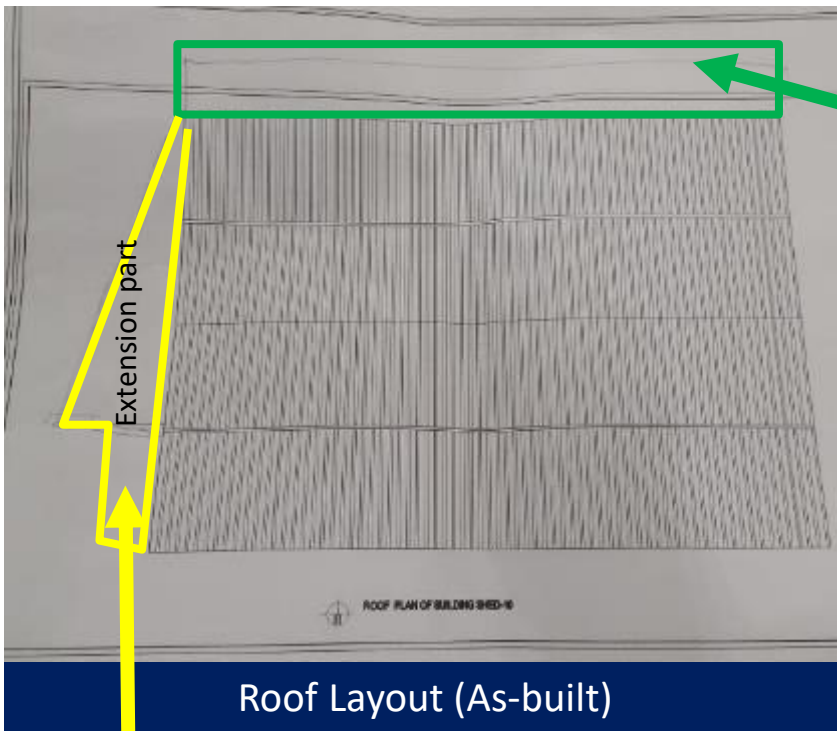
Lack of lateral stability



No bracing system/compression member is provided

No bracing/compression member is provided for the shed therefore the lateral stability system is absent for the structure. Building engineer is required to check the lateral stability of the shed as part of EA and suggest proper remedial work.

Discrepancies in as-built drawing



Extension was observed for this structure which was not shown in as-built drawing. Building engineer is required to survey the structures thoroughly and update the as-built drawing and check the structural stability of whole structure considering the extension part.

Lack of lateral stability



No bracing system/compression member is provided

No bracing/compression member is provided for the shed therefore the lateral stability system is absent for the structure. Building engineer is required to check the lateral stability of the shed as part of EA and suggest proper remedial work.

Corrosion on steel member



Several corroded steel members at the roof

The building engineer is required to identify all the corroded members and provide rust proof paint to prevent corrosion.

Lack of building permit



Shed-11 (Boiler Shed) has no building permit

Building permit drawing was not available for the mentioned structure.
The factory is required to collect building permit from government approved local authority.

Lack of lateral stability system



Lack of vertical load resisting system (bracing)

No vertical load resisting system (bracing) is provided for the shed therefore the lateral stability system is incomplete for the structure. As part of EA, the building engineer is required to check the lateral stability system of the shed and suggest proper alternatives.

Design report needs to be revised

1.4 Codes and Standards

- 4.1.1 Bangladesh national Building Code (BNBC) 2020
- 4.1.2 American Concrete Institute (ACI 318-99)
- 4.1.3 American Society for Testing Materials (ASTM)

Considered design code “BNBC 2020”

Seismic Load:

As per specifications of BNBC-2020, Part - 6, Chapter - 2, Section - 2.5.7,
Equivalent Static Analysis can be applied to calculate the earth quake force of this structure.

Where,

1. Seismic Zone coefficient factor, $Z = 0.2$ for Zone-02
(Ref. Table 6.2.22, Sec 2.5.6.1, Chapter - 2, Part - 6, BNBC - 2006)
2. Importance factor, $I = 1.25$
(Ref. Table 6.2.23, Sec 2.5.6.1, Chapter - 2, Part - 6, BNBC - 2006)
3. Response Modification Factor, $R = 4.5$
(Ref. Table 6.2.24, Sec 2.5.6.2, Chapter - 2, Part - 6, BNBC - 2006)
4. Site Coefficient for Soil Characteristics, $S = 1.35$
5. Seismic Design Category - D

Wind Load:

Project Name:	Fakir Knitting - Singeing Shed	
Length of the Structure =	31.012	m
Width of the Structure =	15.93	m

“BNBC-2006” mentioned in the design report

The building is designed following BNBC-2020 code but BNBC-2006 is mentioned in the seismic load section. Also, connection adequacy check for steel is missing in the design report.

The building engineer is required to update the design report by resolving above mentioned issues following BNBC-2020.

2.5 Foundation Adequacy Check

Bearing Capacity Check: (Allowable Bearing Capacity of Soil = 1.00 tsf (F.S-2.5) After Ground Improvement)

Grid	Footing ID	Provided Area (sft)	FZ (DL+LL) (kip)	Required Area (sft)	Factor of Safety	Bearing Check
C/4	F2	64.00	21.70	6.68	9.59	OK
A/4	F2	64.00	21.70	6.68	9.59	OK

Design report: Allowable bearing capacity 1.0 tsf (FoS 2.5) at 1.5m (5ft) depth

The allowable soil bearing capacity of design report doesn't match with soil test report.

The building engineer is required check the soil test report, determine allowable bearing capacity and revise the foundation adequacy in the design report.

Table No. 4. Bearing Capacities of the Shallow Foundation from Field And Laboratory Test (Values In TsF, F. S = 3)

Bore Hole	Depth in ft.	Field SPT	Cohesion Kg/cm ²	Bearing capacity (TSF)	
				For Circular or square footing	For strip or Continuous footing
BH- 1	5	3	0.20	0.46	0.34
	10	3	0.20	0.46	0.34
	15	2	0.13	0.31	0.23
	20	2	0.13	0.31	0.23
BH- 2	5	3	0.20	0.46	0.34
	10	2	0.13	0.31	0.23
	15	3	0.20	0.46	0.34
	20	3	0.20	0.46	0.34
Bh-3	5	1	0.07	0.15	0.11
	10	2	0.13	0.31	0.23
	15	3	0.20	0.46	0.34
	20	3	0.20	0.46	0.34

Soil test report: Allowable bearing capacity 0.15 tsf to 0.46 tsf (FoS=3)

Observation: Shed-12 (Seinging Shed)

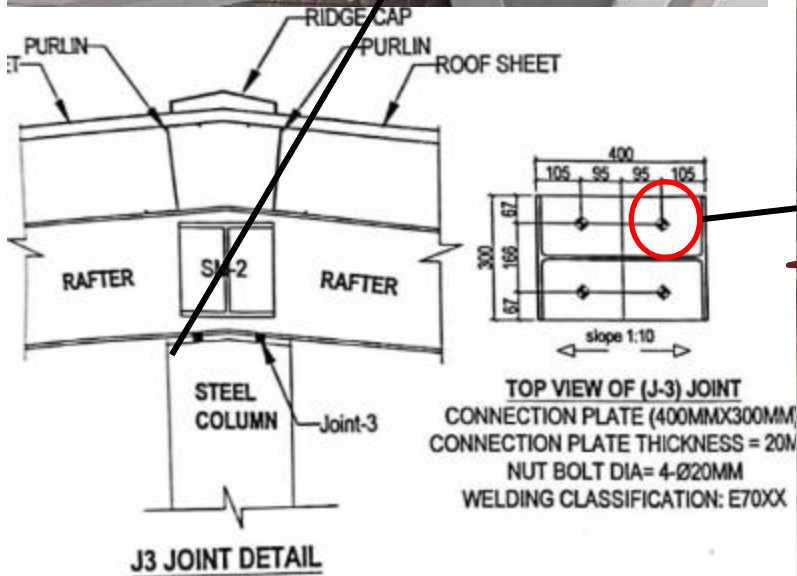
Discrepancy in as-built drawing



Bracings connected apart from column-rafter joint

As per drawing bracings are supposed to be connected in the column-rafter joint but bracings were connected apart from the column-rafter joint. The building engineer is required to check the bracing connections and update the as-built drawing accordingly. Also, revise the analysis as per onsite condition.

Bolt missing in steel connection



Connection plate and missing bolts



Bolt missing; only one connected bolt was found instead of four bolts

Bolt missing was observed for the steel column to rafter connection at ridge. Among 4, only one bolt was found. The building engineer is required to identify the locations and install missing bolts.

Apparently inadequate connection



Roof truss connected to brick wall

Roof truss was found connected to brick wall which appeared to be inadequate. The building engineer is required to check the connection adequacy and suggest necessary remedial actions.

Lack of lateral stability system

Observation: Shed-14 (Dyes Chemical Store)



Absence of lateral load transfer media along transverse direction of rafter

Bracing & compression strut was not provided to resist the lateral load. Also, in mezzanine floor moment connection is provided in one direction only. The building engineer is required to carryout the lateral stability of the structure as part of (EA) and suggest proper remedial actions accordingly.

Apparently inadequate connection



Truss is inserted to brick wall



Poor connection of truss to steel pipe



Connection of steel stair & RC slab was appeared to be inadequate.



Cut off bottom truss member at several location

Roof truss was found connected to brick wall which was appeared to be inadequate. Also, cut off truss member found in several locations. As part of Engineering Assessment (EA), the building engineer is required to check the connection system, prepare connection details, calculate the capacity of connections for lateral forces and suggest proper remedial actions accordingly.

Observation: Shed-14 (Dyes Chemical Store)

Lack of floor load plan



Mezzanine floor

There was no floor load plan for mezzanine floor. The building engineer is required to survey the occupancy produce floor load plan accordingly.

Non-structural elements found unbraced and not anchored



Storage rack found within the building without braced/anchored

All non-structural elements including storage racks in the building shall be adequately anchored or braced to resist earthquake forces.

Dampness and vegetation on mezzanine level



Dampness and vegetation were observed on the mezzanine level. Factory is required to repair the dampness.

Dampness and vegetation on exterior wall

Exposed reinforcement left at mezzanine level



Exposed reinforcement left at mezzanine level

Exposed reinforcement is left which was prone to corrosion. Factory is required to provide rust proof paint on exposed reinforcement to protect from corrosion.

Lack of as-built drawing



Shed-15

As-built drawing was not found on-site which is required to be prepared.

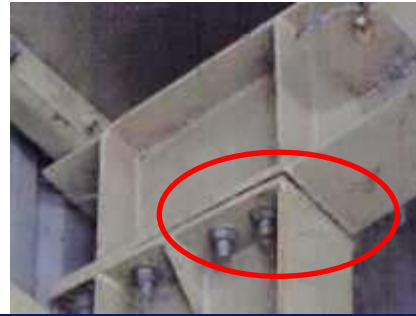
Lack of lateral stability system



Absence of lateral load transfer media along transverse direction of rafter

Compression strut was not provided to transfer the lateral loads. The building engineer is required to carryout Engineering Assessment (EA) to check the lateral stability of the structure and suggest proper remedial actions accordingly.

Improper connections



Gap between connection plates



Bracings were connected apart from column-rafter joint



Offset of connection

The bracing is not connected to column-rafter joints. Besides, offset observed in connection. Also, large gap between connection plates were observed. The building engineer is required to fill the gap with appropriate method; check the connections system and incorporate the adequacy check in the design report.

Loose cable bracing



Loose cable bracing

Loose cable bracing was observed at several locations. The factory is required to identify the location and tighten the loose cable bracings.

Ancillary Structures

Lack of as built drawings



1. RMS Room



2&3. Canteen & Smoke Shed



4. General Security Post,
Main Gate



5. Female Security
Post, Main Gate



6. Container Security
Office, Main Gate



7. Cycle Garage



8. General Security
Post, Gate-1

Building Engineer is required to survey the structures and prepare a set of as-built drawings for all ancillary structures.

Lack of lateral stability of container sheds (Ancillary- 2, 3, 4, 5 & 6)



Lack ground anchorage and foundation system observed for ancillary 2, 3, 4, 5 & 6. The building engineer is required to check the stability of container sheds for uplift and lateral forces and suggest necessary alternatives accordingly.

Lack ground anchorage and foundation system for ancillary 2 & 3 (Canteen & Smoke Shed)



Lack ground anchorage and foundation system for ancillary 4, 5 & 6 (General Security Post, Female Security Post and Container Security Office at main gate)

Dampness & crack on brick wall



Dampness on wall and roof slab



Crack on brick wall

The building engineer is required to identify the source of dampness on wall & roof slab; find the reason of crack on brick wall and carry out suitable repair works accordingly.

Problems Observed

Building-4 (Generator Building):

Item 01: High stress in the column.

Item 02: Lack of foundation details.

Item 03: Vertical extension without approval drawing.

Item 04: Corrosion in adjacent steel stair.

Item 05: Lack of lateral stability in adjacent steel stair and improper connection of steel platform

Item 06: Dampness on wall and roof.

Item 07: Vibration in all floors.

Building-7 (Chiller Building):

Item 08: Lack of design documents.

Item 09: Heavy loading on roof.

Item 10: Lack of lateral stability of adjacent steel stair.

Item 11: Discrepancy in as-built drawings.

Item 12: Falling hazard at roof and adjacent steel stair.

Problems Observed

Building-9 (Old ETP Building):

Item 13: Lack of design documents for blower building.

Item 14: Falling hazard at Old ETP.

Building-10 (New ETP Building):

Item 15: Lack of as-built drawing & design documents for the steel roof system.

Item 16: Inadequate railing at New ETP.

Shed-8 (Dyeing Color Lab):

Item 17: Lack of lateral stability.

Item 18: Cracks on wall at several locations.

Item 19: Falling hazard.

Shed-9 (New Dyeing Shed):

Item 20: Lack of lateral stability.

Item 21: Structural connection between Shed-9 & Shed-10.

Shed-10 (Old Dyeing Shed):

Item 22: Structural connection of Shed-10 with adjacent Shed-3 & Shed-9.

Item 23: Lack of lateral stability.

Item 24: Discrepancies in as-built drawing.

Problems Observed

Shed-11 (Boiler Shed):

- Item 25: Lack of lateral stability.
- Item 26: Corrosion on steel member.
- Item 27: Lack of building permit.

Shed-12 (Seinging Shed):

- Item 28: Lack of lateral stability system
- Item 29: Design report needs to be revised.
- Item 30: Discrepancy in as-built drawing.
- Item 31: Bolt missing in steel connection.

Shed-13 (Acid Store):

- Item 32: Apparently inadequate connection.

Shed-14 (Dyes Chemical Store):

- Item 33: Lack of lateral stability system.
- Item 34: Apparently inadequate connection.
- Item 35: Lack of floor load plan.
- Item 36: Non-structural elements found unbraced and not anchored.
- Item 37: Dampness and vegetation on mezzanine level.
- Item 38: Exposed reinforcement left at mezzanine level.

Problems Observed

Shed-15 (Sludge Store)

Item 39: Lack of as-built drawing.

Shed-16 (Printing Shed):

Item 40: Lack of lateral stability system.

Item 41: Improper connections.

Item 42: Loose cable bracing.

Ancillary structures:

Item 43: Lack of as-built drawings.

Item 44: Lack of lateral stability of container shed (ancillary- 2, 3, 4, 5 & 6).

Ancillary structure (RMS Room):

Item 45: Dampness & crack on brick wall.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	High stress in the column Building-4 (Generator Building)	Limit floor live loading within 3 kPa until finalizing the allowable floor load plan.	Immediate
02	High stress in the column Building-4 (Generator Building)	Verify in-situ concrete strength through taking 4 number of cores for each construction phase from lower tier of the building.	6-weeks
03	High stress in the column Building-4 (Generator Building)	Carry out Detail Engineering Assessment (DEA) to review the design, loads and column stress in the column based on in-situ material strength, actual machinery loads and minimum floor live loads. Submit the DEA documents to the RSC for review.	6-weeks
04	High stress in the column Building-4 (Generator Building)	Produce and actively manage a floor live load plan for all floors of the building based on floor, column & foundation capacity. The floor load plan must include machinery weight and specifications	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
05	High stress in the column Building-4 (Generator Building)	Carry out necessary remedial works as per DEA.	6-months
06	High stress in the column Building-4 (Generator Building)	Continue to implement allowable floor load plan.	6-months
07	Lack of foundation details Building-4 (Generator Building)	Carry out geotechnical investigation to close vicinity of the building to determine the soil properties.	6-weeks
08	Lack of foundation details Building-4 (Generator Building)	As part of DEA, the building engineer is required to investigate the actual foundation sizes, prepare as-built structural drawings of foundations, check the foundation adequacy of the building and suggest proper remedial actions. Submit DEA documents to the RSC for review.	6-weeks
09	Lack of foundation details Building-4 (Generator Building)	Carry out necessary remedial works as per DEA.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
10	Vertical extension without approval drawing Building-4 (Generator Building)	The factory is required to collect revised building permit drawing for the structure from government approved local authority.	6-months
11	Corrosion in adjacent steel stair Building-4 (Generator Building)	Building Engineer is required to identify all corroded member, remove the corrosion and apply suitable anti-corrosive coating to the affected steel members.	6-weeks
12	Lack of lateral stability in adjacent steel stair and improper connection of steel platform Building-4 (Generator Building)	Building Engineer is required to check the lateral stability and connection adequacy of the steel stair.	6-weeks
13	Lack of lateral stability in adjacent steel stair and improper connection of steel platform Building-4 (Generator Building)	Carry out suggested remedial works if required	6-weeks
14	Dampness on wall and roof Building-4 (Generator Building)	The building engineer is required to take necessary steps to repair the damp areas and apply water proofing layer on the roof with proper slope.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
15	Vibration in all floors Building-4 (Generator Building)	Building engineer is required to identify the cause of vibration, check the long-term effect on the structure and suggest suitable action to reduce the vibration.	6-weeks
16	Vibration in all floors Building-4 (Generator Building)	Carry out suggested remedial works if required.	6-months
17	Lack of design documents Building-7: Chiller Building	As part of Engineering Assessment (EA), prepare a set of design documents (including as-built drawings, floor load plan and design report based on in-situ material strength & software-based analysis) for the building following BNBC (part-6, section 1.9.1). Submit the design documents to the RSC for review.	6-weeks
18	Lack of design documents Building-7: Chiller Building	Carry out suggested remedial works as per EA.	6-months
19	Lack of design documents Building-7: Chiller Building	Continue to implement floor load plan.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
20	Heavy loading on roof Building-7: Chiller Building	Building engineer is required to produce a floor load plan for based on floor and column capacity of the building.	6-weeks
21	Heavy loading on roof Building-7: Chiller Building	Continue to implement floor load plan.	6-months
22	Lack of lateral stability of adjacent steel stair Building-7: Chiller Building	The building engineer is required to check the lateral stability of the steel stair and suggest remediation if required.	6-weeks
23	Lack of lateral stability of adjacent steel stair Building-7: Chiller Building	Carry out suggested remedial works if required.	6-months
24	Discrepancy in as-built drawings Building-7: Chiller Building	Building engineer is required to revise the drawings as per site condition.	6-weeks
25	Falling hazard at roof and adjacent steel stair Building-7: Chiller Building	Building engineer is required to add barrier for open area to prevent falling hazard for both roof and adjacent steel stair.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
26	Lack of design documents for blower building Building-9: Old ETP Building	Carry out Engineering Assessment (EA) and prepare a set of design documents (including as-built drawings, floor load plan and design report based on in-situ material strength & software-based analysis) for the building following BNBC (part-6, section 1.9.1).	6-weeks
27	Lack of design documents for blower building Building-9: Old ETP Building	Carry out remedial works as per EA.	6-months
28	Falling hazard at Old ETP Building-9: Old ETP Building	Building engineer is required to provide additional newel post and balusters to the railing to prevent possible falling hazard.	6-weeks
29	Lack of as built drawings & design documents for the steel roof system. Building-10: New ETP Building	Carry out Engineering Assessment (EA) and prepare a set of design documents (including as-built drawings and design report based on in-situ material strength & software-based analysis) for the structure following BNBC (part-6, section 1.9.1).	6-weeks
30	Lack of as built drawings & design documents for the steel roof system. Building-10: New ETP Building	Carry out remedial works as per EA (if required).	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
31	Inadequate railing at New ETP (Building-10: New ETP Building)	Building engineer is required to provide additional newel post and balusters to the railing to prevent possible falling hazard.	6-months
32	Lack of lateral stability (Shed-8: Dyeing Color Lab)	Building engineer is required to add barrier for open area to prevent falling hazard for both roof and adjacent steel stair.	6-Weeks
33	Lack of lateral stability (Shed-8: Dyeing Color Lab)	Carry out suggested remedial work where required.	6-months
34	Cracks on wall at several locations.(Shed-8: Dyeing Color Lab)	The factory engineer is required to identify the reason of the cracks and suggest proper remedial works.	6-weeks
35	Cracks on wall at several locations.(Shed-8: Dyeing Color Lab)	Carry out suggested remedial work if required.	6-months
36	Falling hazard. (Shed-8: Dyeing Color Lab)	The factory is required to provide suitable fall protection system to avoid falling hazard.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
37	Lack of lateral stability. (Shed-9: New Dyeing Shed)	The building engineer is required to carry out Engineering Assessment (EA) to check the lateral stability of the structure and suggest proper remedial actions accordingly.	6-Weeks
38	Lack of lateral stability. (Shed-9: New Dyeing Shed)	Carry out suggested remedial work where required.	6-months
39	Structural connection between Shed-9 & Shed-10. (Shed-9: New Dyeing Shed)	The building engineer is required to survey the structures and update the as-built drawing.	6-weeks
40	Structural connection between Shed-9 & Shed-10. (Shed-9: New Dyeing Shed)	Building engineer is required to either separate the structures or analyze the two structures as one.	6-weeks
41	Structural connection between Shed-9 & Shed-10. (Shed-9: New Dyeing Shed)	Carry out suggested remedial work where required.	6-months
42	Structural connection of Shed-10 with adjacent Shed-3 & Shed-9. (Shed-10: Old Dyeing Shed)	The building engineer is required to survey the structures and update the as-built drawing with structural connection details.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
43	Structural connection of Shed-10 with adjacent Shed-3 & Shed-9. (Shed-10: Old Dyeing Shed)	Revise the design documents considering structural connection of the structures.	6-Weeks
44	Structural connection of Shed-10 with adjacent Shed-3 & Shed-9. (Shed-10: Old Dyeing Shed)	Carry out suggested remedial works where required	6-months
45	Lack of lateral stability. (Shed-10: Old Dyeing Shed)	The building engineer is required to carry out Engineering Assessment (EA) to check the lateral stability of the roof system and suggest proper remedial actions accordingly	6-weeks
46	Lack of lateral stability. (Shed-10: Old Dyeing Shed)	Carry out suggested remedial works.	6-months
47	Discrepancies in as-built drawing. (Shed-10: Old Dyeing Shed)	The building engineer is required to survey the structures thoroughly and update the as-built drawing as per actual site condition.	6-weeks
48	Discrepancies in as-built drawing. (Shed-10: Old Dyeing Shed)	Incorporate the extension part of the shed in the design check.	6-weeks
49	Discrepancies in as-built drawing. (Shed-10: Old Dyeing Shed)	Carry out suggested remedial works.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
50	Lack of lateral stability (Shed-11: Boiler Shed)	As per Engineering Assessment (EA), the building engineer is required to check the lateral stability of the structure and suggest proper remedial actions accordingly.	6-Weeks
51	Lack of lateral stability (Shed-11: Boiler Shed)	Carry out necessary remedial works as per EA.	6-months
52	Corrosion on steel member (Shed-11: Boiler Shed)	The building engineer is required to identify all the corrosive members and take proper remedial actions accordingly.	6-weeks
53	Lack of building permit (Shed-11: Boiler Shed)	The factory is required to collect revised building permit drawing for the structure from government approved local authority.	6-months
54	Lack lateral stability system (Shed-12: Seinging Shed)	The building engineer is required to carry out Engineering Assessment (EA) to check the lateral stability system of the structure and suggest proper alternatives	6-weeks
55	Lack lateral stability system (Shed-12: Seinging Shed)	Carry out remedial works if required	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
56	Design report needs to be updated (Shed-12: Seinging Shed)	The building engineer is required to revise the design report for applicable building code, offset of bracing connections and actual bearing capacity of foundation.	6-Weeks
57	Design report needs to be updated (Shed-12: Seinging Shed)	Carry out remedial works if required.	6-months
58	Discrepancy in as-built drawing (Shed-12: Seinging Shed)	The building engineer is required to check the bracing connections and update the as-built drawing accordingly.	6-weeks
59	Bolt missing in steel connection (Shed-12: Seinging Shed)	The building engineer is required to identify the locations and install missing bolt accordingly.	6-weeks
60	Apparently inadequate connection. (Shed-13: Acid Store)	The building engineer is required to check the member & connection adequacy and suggest necessary remedial actions	6-weeks
61	Apparently inadequate connection. (Shed-13: Acid Store)	Carry out suggested remedial works where required	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
62	Lack of lateral stability system (Shed-14: Dyes Chemical Store)	The building engineer is required to carryout Engineering Assessment (EA) to check the connections & lateral stability of the structure and suggest proper remedial actions accordingly.	6-Weeks
63	Lack of lateral stability system (Shed-14: Dyes Chemical Store)	Carry out suggested remedial works as per EA.	6-months
64	Apparently inadequate connection (Shed-14: Dyes Chemical Store)	As part of Engineering Assessment (EA), the building engineer is required to check the connection system, prepare connection details, calculate the capacity of connections for lateral forces and suggest proper remedial actions accordingly.	6-weeks
65	Apparently inadequate connection (Shed-14: Dyes Chemical Store)	Carry out suggested remedial works as per EA.	6-months
66	Lack of floor load plan. (Shed-14: Dyes Chemical Store)	The building engineer is required to survey the occupancy and produce floor load plan accordingly.	6-weeks
67	Lack of floor load plan (Shed-14: Dyes Chemical Store)	Continue to implement floor load plan.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
68	Non-structural elements found unbraced and not anchored (Shed-14: Dyes Chemical Store)	All non-structural elements including storage racks in the building shall be adequately anchored or braced to resist earthquake forces.	6-months
69	Dampness and vegetation on mezzanine level (Shed-14: Dyes Chemical Store)	Factory is required to clean the vegetation and repair the dampness.	6-weeks
70	Exposed reinforcement left at mezzanine level. (Shed-14: Dyes Chemical Store)	Factory is required to provide rust proof paint on exposed reinforcement to protect the rebar from corrosion	6-months
71	Lack of as-built drawings (Shed-15: Sludge Store)	Prepare a set as-built drawings for the structure with connection details.	6-weeks
72	Lack of lateral stability system (Shed-16: Printing Shed)	The building engineer is required to carryout Engineering Assessment (EA) to check the lateral stability of the structure and suggest proper remedial actions accordingly	6-weeks
73	Lack of lateral stability system (Shed-16: Printing Shed)	Carry out remedial works as per EA	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
74	Improper connections (Shed-16: Printing Shed)	The building engineer is required to fill the gap with appropriate method.	6-weeks
75	Improper connections (Shed-16: Printing Shed)	Check the connections system and incorporate the adequacy check in the design report.	6-weeks
76	Improper connections (Shed-16: Printing Shed)	Carry out remedial works if required.	6-months
77	Loose cable bracing (Shed-16: Printing Shed)	The factory is required to tighten the loose cable bracings.	6-weeks
78	Lack of as built drawings (Ancillary structures)	Building Engineer is required to survey the structures and prepare a set of as-built drawings for all ancillary structures	6-weeks
79	Lack of lateral stability of container sheds (ancillary- 2, 3, 4, 5 & 6). (Ancillary structures)	The building engineer is required to check the stability of container sheds for uplift and lateral forces and suggest necessary alternatives accordingly	6-weeks
80	Lack of lateral stability of container sheds (ancillary- 2, 3, 4, 5 & 6) Ancillary structures	Carry out remedial works if required	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
81	Dampness & crack on brick wall (Ancillary Structure: RMS Room)	The building engineer is required to identify the source of dampness on wall & roof slab;	6-weeks
82	Dampness & crack on brick wall (Ancillary Structure: RMS Room)	Find the reason of crack on brick wall and carry out suitable repair works accordingly.	6-weeks