



Libas Textiles Ltd. (New building)

Nishchintapur, Mouchak, Kaliakoir, Gazipur.

Co-ordinates: 24.017511N, 90.280128E

10th July & 5th August 2019



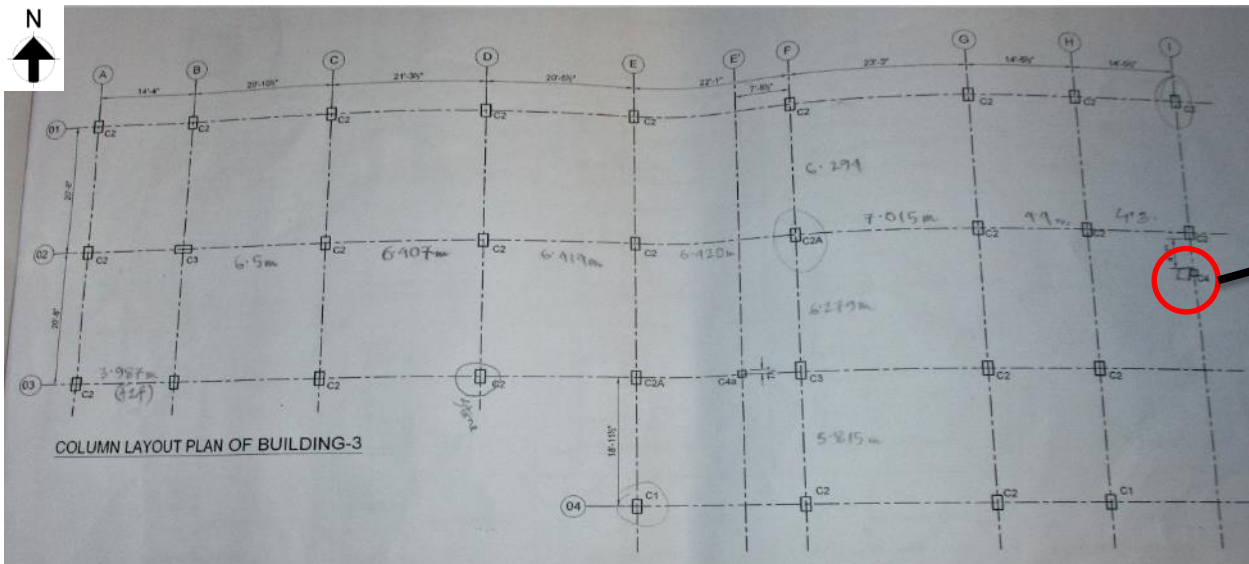


Observations

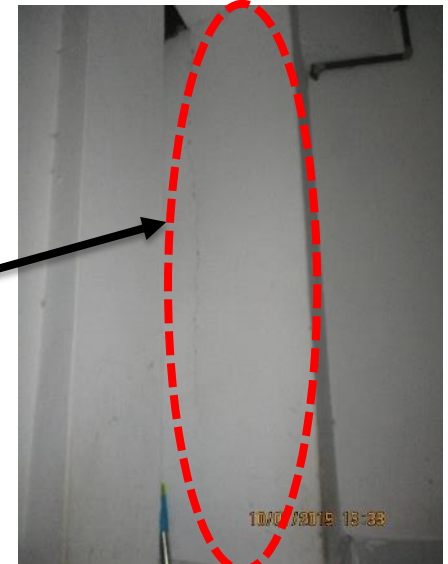


Discrepancies between as-built drawings and on-site observation

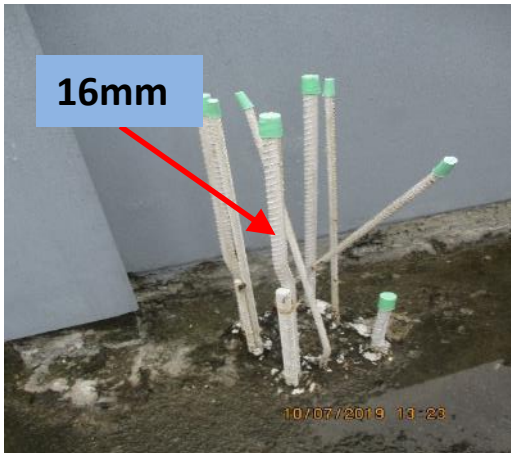
Observations: Building-3



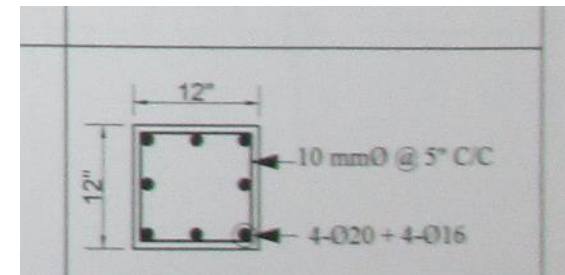
Column Layout Plan



C-4 type column

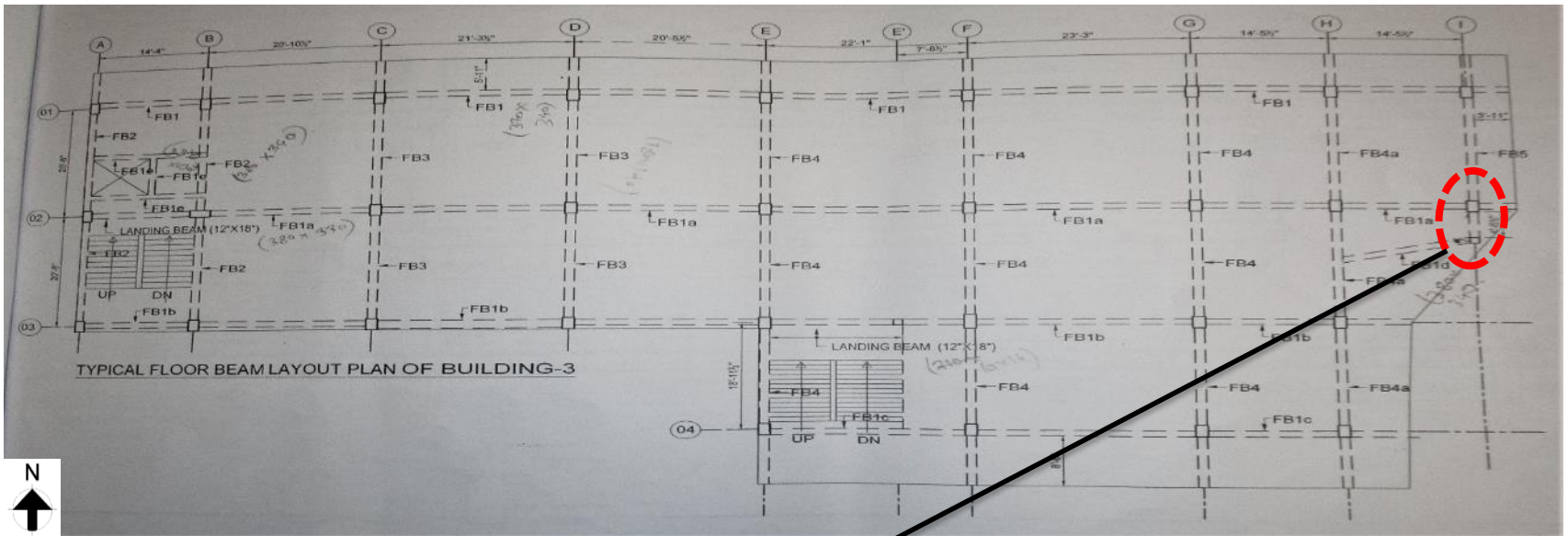


4 nos. 16 mm and 4 nos. 12 mm rebars were found on site in C-4 type column

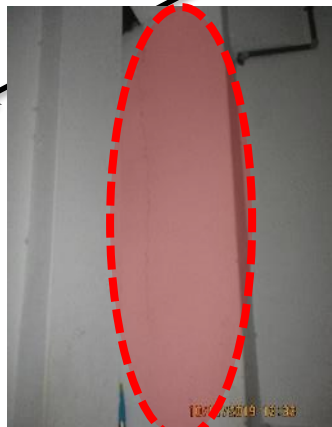
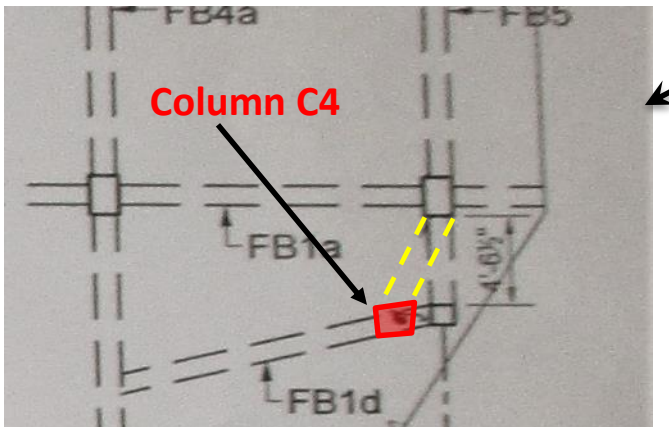


4 nos. 20mm and 4 nos. 16mm rebar were shown in column schedule for C-4 type column at roof

Observations: Building-3



Typical Beam Layout Plan



Beam FB5 was found offset towards west from grid I2'.

Observations: Building-3



Water clogging and lack of drainage system on roof

Observations: Building-3



Water clogging was observed on roof top which indicates poor drainage system. Factory engineer is required to provide appropriate remediation to improve drainage system.

Observations: Building-3



Exposed rebar on roof



Most of the exposed reinforcement on roof level were painted but some of the columns have exposed reinforcements which are susceptible to corrosion. Adequate protection from corrosion is required to be provided to all the exposed reinforcements.



Water clogging and lack of drainage system on roof

Observation: Building-4



Water clogging was observed on roof top which indicates poor drainage system. Moreover, water was seeping through roof top slab. Factory engineer is required to provide water proofing material with appropriate sloping and improve drainage system.



Observation : Building-4



Cracks under slab soffit & beam



Floor Layout (Cracking zone shown in red)



Cantilever slab with cracks

Hairline cracks were observed on slab soffit (cantilever region) and on several floor beams. Sign of water ingress through the cracks on the roof slab was observed.



Water ingress through cracks on slab



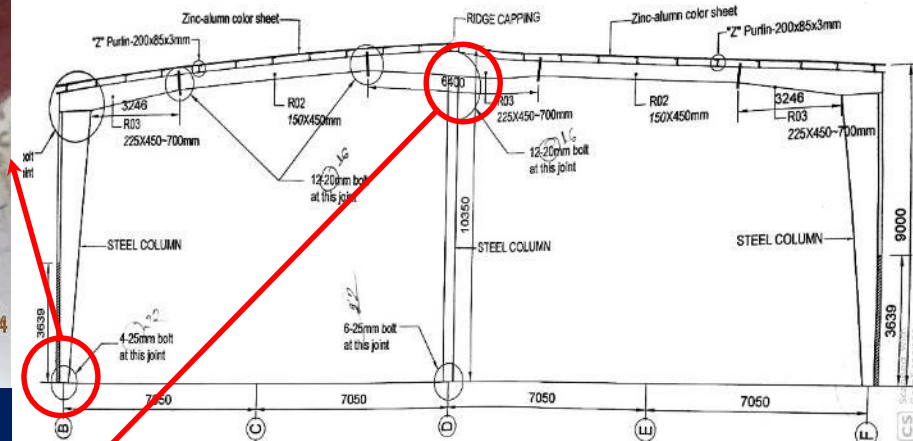
Cracks on peripheral beams



Incomplete as-built drawings



Anchor bolts were 22 mm instead of 25 mm as mentioned in provided as-built drawings.



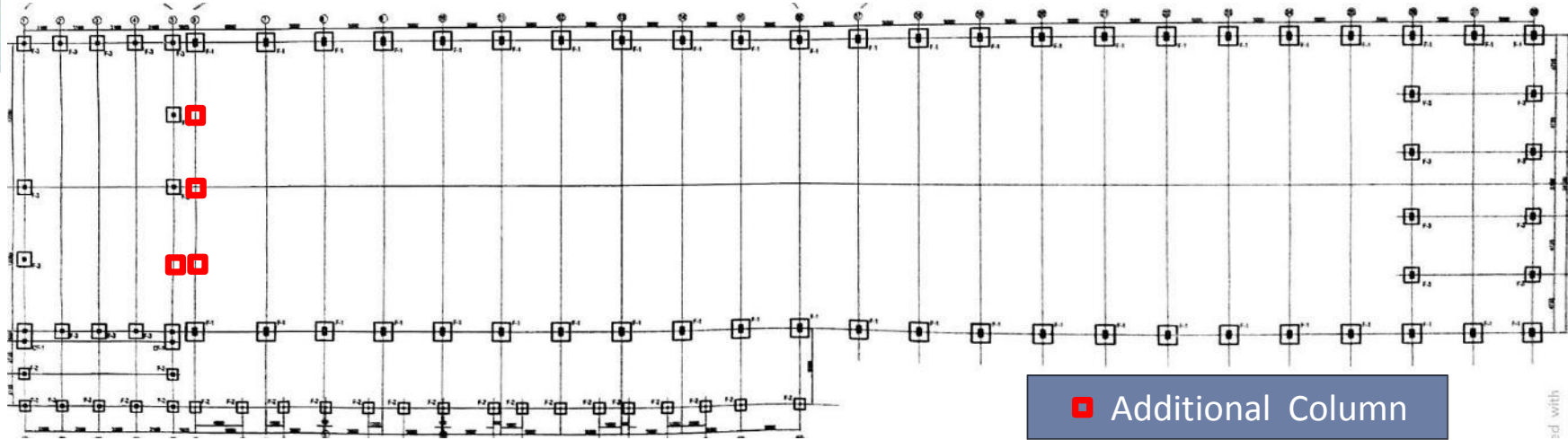
Section drawing



Column-rafter joint has 16-16 mm bolts and rafter-rafter joint has 12-16 mm bolts instead of 16-20 mm bolts as mentioned in as-built drawings

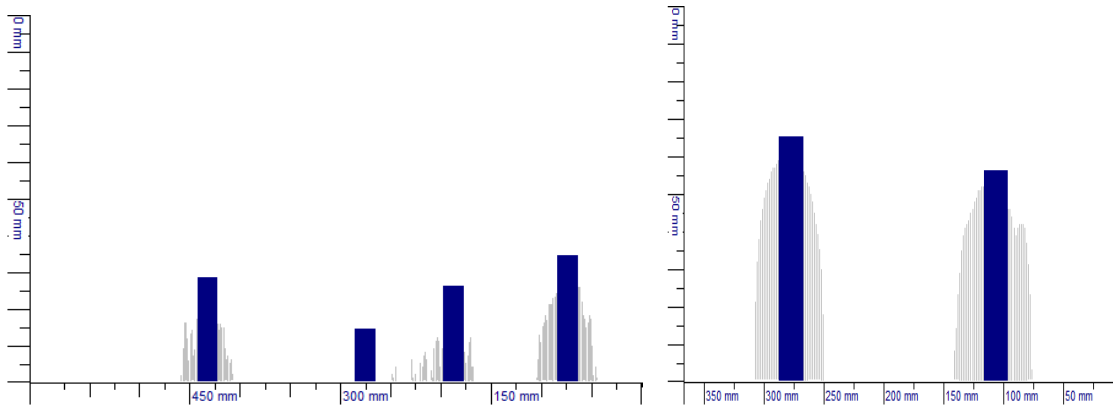
Connection and anchor bolt details provided in as built drawing did not match with on site condition.
Bracing layout or bracing details wasn't incorporated in the as-built drawings.

Observations: Dyeing Shed (New Part)



■ Additional Column

Column layout plan



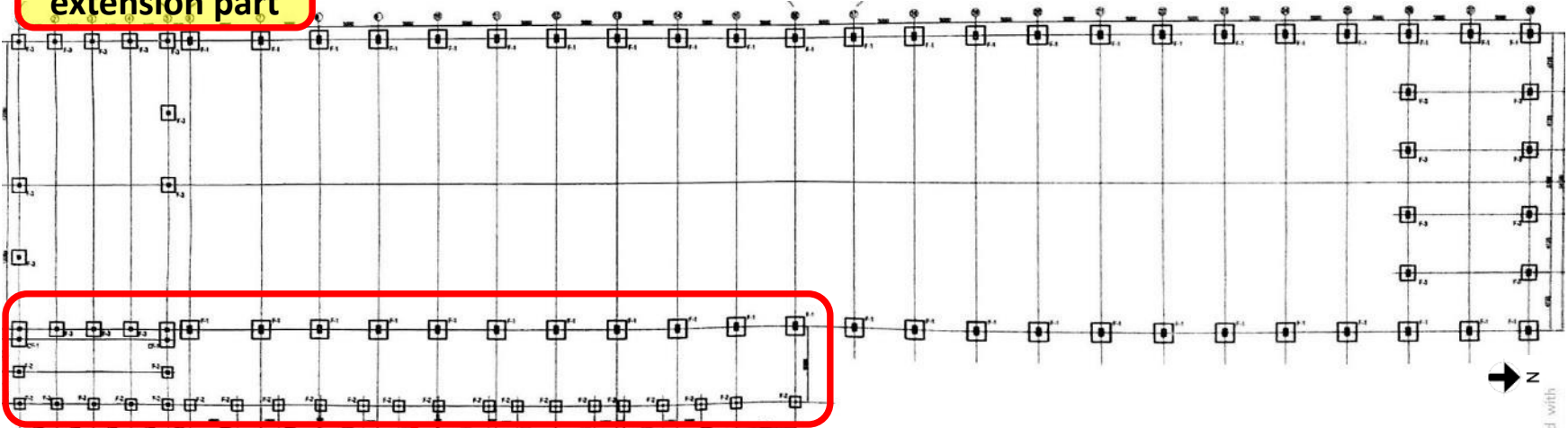
8-20 mm rebars were found in C1 type columns instead of 12-20 mm rebars.

Number of reinforcement mentioned in the as-built drawing was not representative of on site condition. Column layout also did not match with the drawing.

Observations: Dyeing Shed (Old Part)



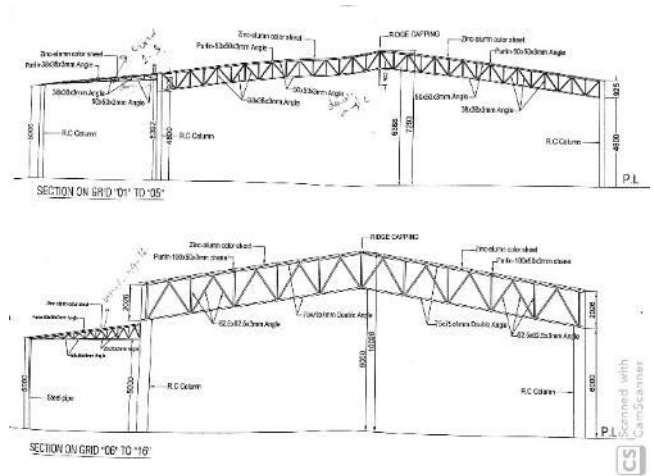
Undocumented extension part



Column layout plan



Extension part of the shed mentioned in the drawing



Sectional drawing of extension part

Extension part in western side of the shed shown in the as-built drawing was not representative of on site condition. There was also an undocumented extension part of the shed.



No connection detail of the RC column and steel truss was incorporated in the as-built drawing



Damaged Structural Member and removed beam & walls



Beams were cut off at some locations.



Two RC columns were replaced by a steel pipe



125mm thick and approximately 2m wall

Wall below lintel was removed to insert machines in the shed. And only a steel pipe was placed in the middle of the lintel to support upper wall. The total span of the wall is 5.8 m.



Some of the structural members were severely damaged.



Apparent lack of lateral stability

Observation : Dyeing Shed





Bracings in old part of the Dyeing Shed

The ridge height is 10 m and the roof slope is quite steep. The continuous load transfer media along the long direction of roof is apparently missing. Vertical bracings between the trusses appeared to be inadequate against lateral loading. Moreover, no bracing layout or bracing details was incorporated in as-built drawings. Building engineer is required to review the design consideration and requirement of bracing system against lateral loading.

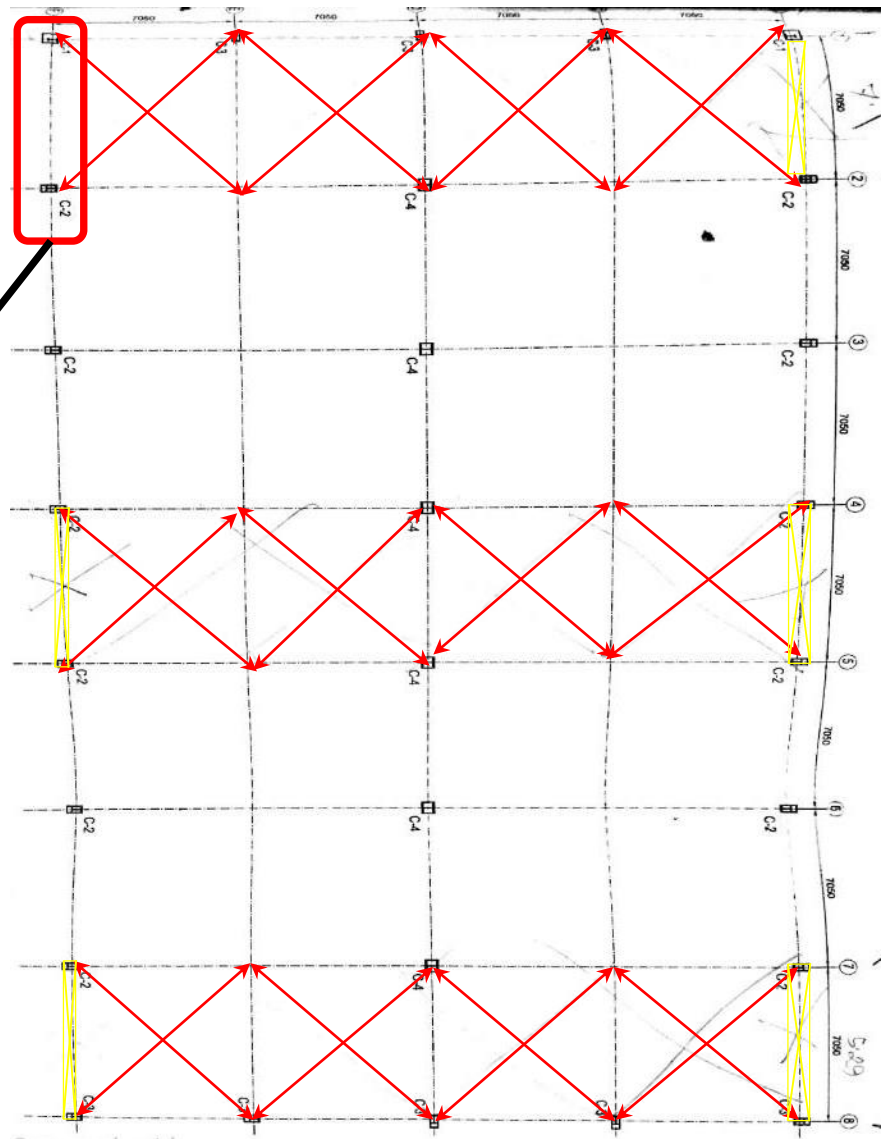
Observations: Dyeing Shed



 Roof bracing
 Vertical bracing



Vertical bracing was not found at grid F between 1 & 2.
Bracing layout for new part of the shed was not incorporated in the as-built drawing.



Bracing layout plan (New Part)

Observations: Dyeing Shed



Adequacy check for steel mezzanine



Steel Mezzanine Floor



A self supported steel mezzanine was observed in the shed for proposed store. Apparently inadequate member was observed to carry the proposed storage load. Building Engineer is required to check the adequacy of the mezzanine for vertical loading and prepare a load plan.



Apparently non-engineered external steel stair



Undocumented steel stair adjacent to dyeing shed



Pipe column



Stair detail

Apparently non-engineered steel stair was observed adjacent to dyeing shed which is used for ascending on steel mezzanine. No drawings were available for those stair. Poor connection between the members was observed.



Loose cable bracings



Horizontal roof bracings and vertical bracings were found loose.



Loose vertical bracing

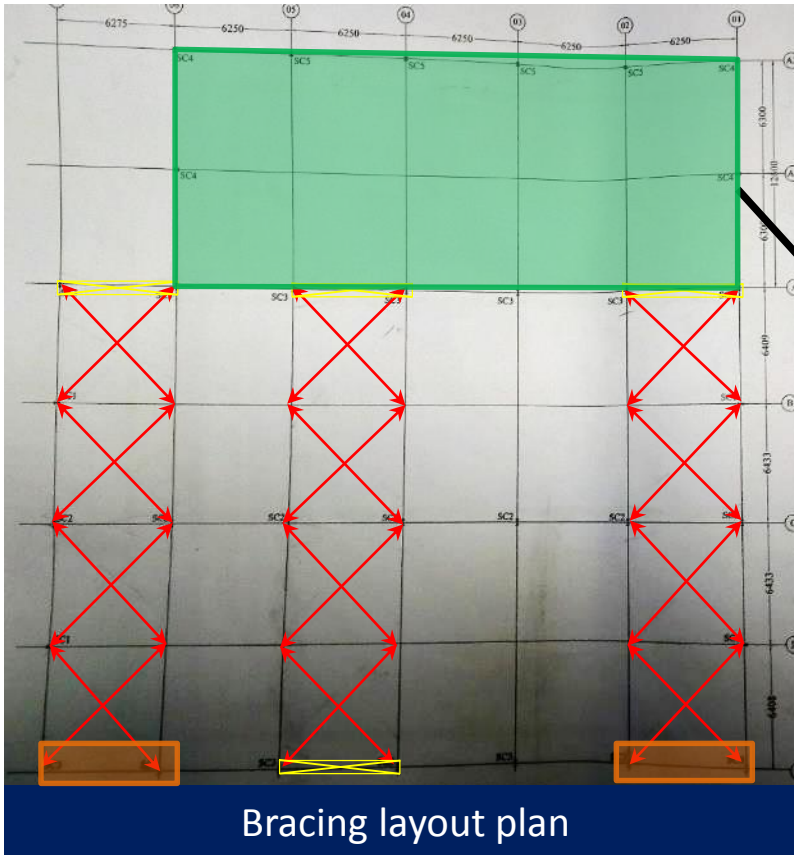


Loose roof bracing



Wall bracing missing in long direction

Observation : Finished Goods Store



Bracing layout plan

No vertical bracing was found at Grid E between 1 & 2 and 6 & 7. Bracing from this location was removed due to exit placement. Moreover, there were no bracing in the marked region of the shed.



No roof bracing was observed in this part

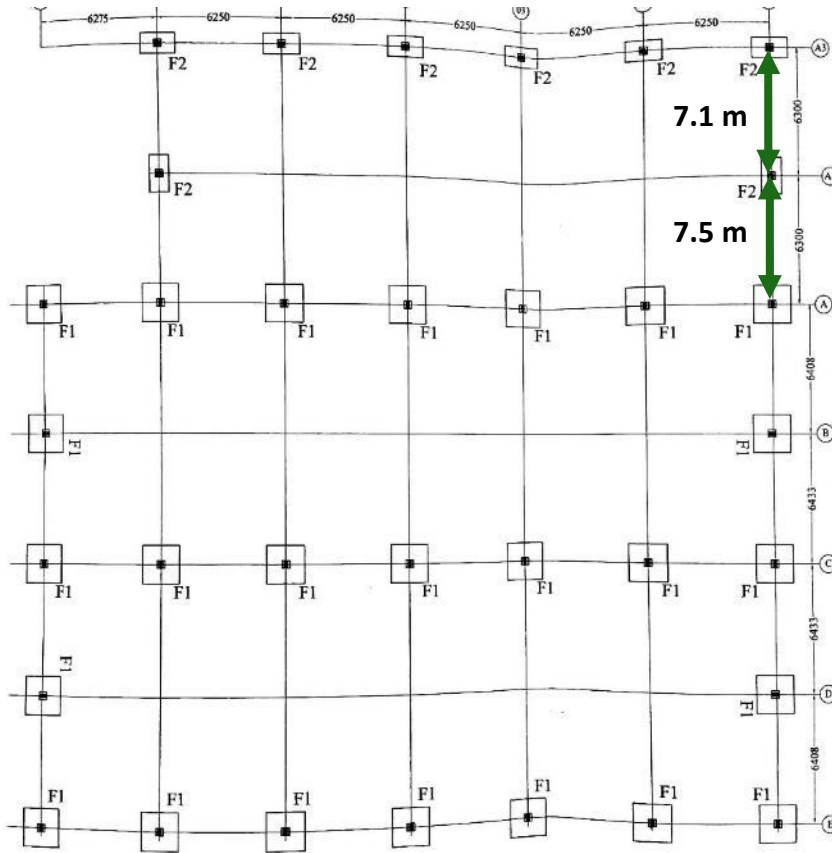


Position of two exits at Grid E

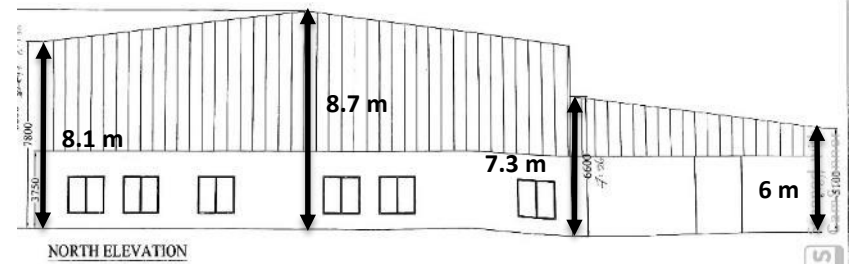
Observation : Finished Goods Store



Incomplete as-built drawings and connection adequacy check

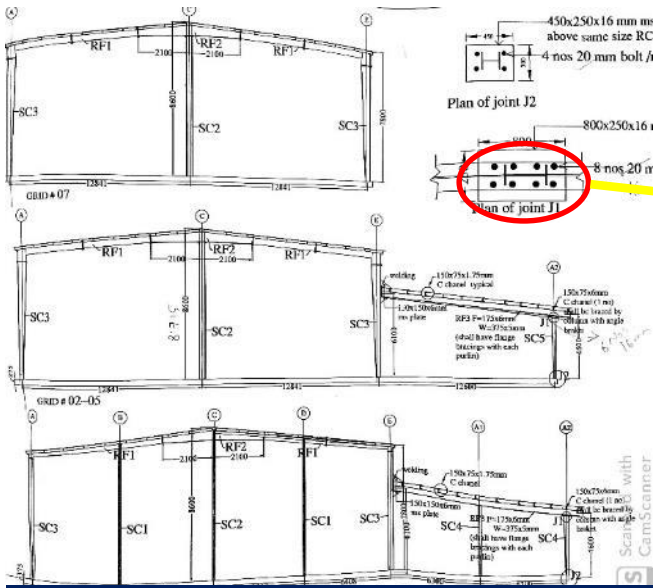


Grid dimension mentioned in the provided as built drawing (Shown on the layout) does not match the on site condition.



Section height mentioned in the provided as built drawing (Shown on the layout) does not match the on site condition.

Building Engineer is required to survey the whole structure to prepare accurate as-built drawings with actual dimension.



Section drawing



Joint J1 has 8-16 mm bolts instead of 8-20 mm bolts as mentioned in as-built drawings



Connection detail was not provided for rafter-rafter joint between grid A to A2



Connection detail for any of the joints was not provided between grid A to E.

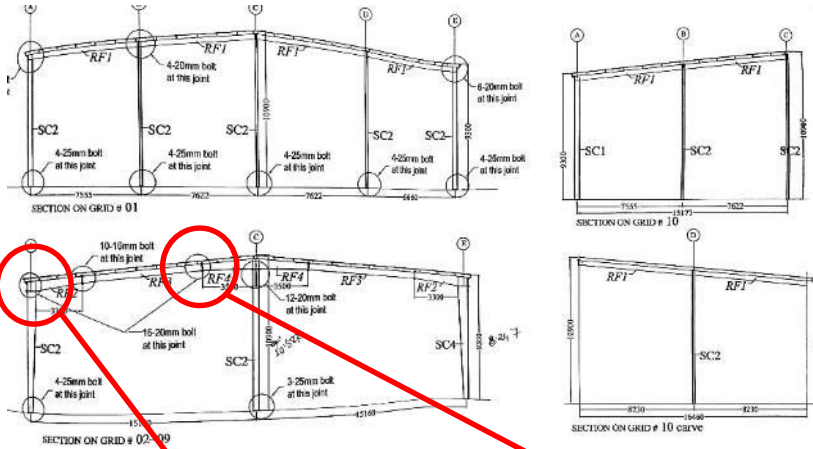


No connection details or anchor bolt details was incorporated in provided as-built drawings for joints between grid A to E. Moreover, connection details for grid A to A2 were not complete. Building engineer is required to check for connection adequacy.

Observation : Finished Goods Store



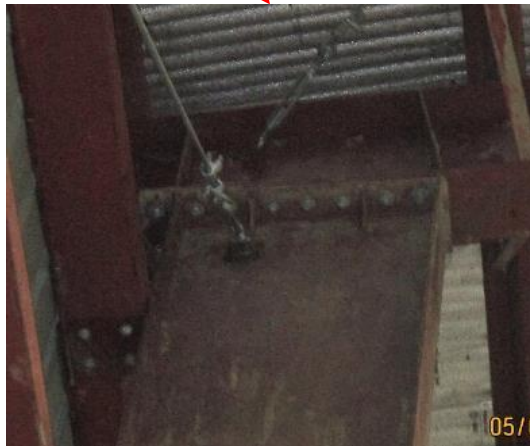
Incomplete as-built drawings and connection adequacy check



Section drawing



Anchor bolts were 20 mm instead of 25 mm.



Column-rafters joint has 16-16 mm bolts and rafter-rafters joint has 12-16 mm bolts instead of 16-20 mm bolts as mentioned in as-built drawings.



No connection details was provided for Grid 10. Anchor bolt details were not matched with provided drawing. Building engineer is required to survey the whole structure to prepare accurate as-built drawings with actual dimension. Also building engineer is required to check for connection adequacy.



Existence of significant gap between connections

Observation : Yarn Store



Gap between column-rafter connection



Gap between rafter-rafter connections



Existence of significant gap was observed between column-rafter and rafter-rafter connections at several locations. Building engineer is required to take required remediation to diminish the gaps between the connections.



Loose cable bracings



Roof and vertical cable bracings were found loose.



Loose vertical bracing



Loose roof bracing



Apparent lack of lateral stability and inadequate connections

**Observations: Worker Dining, Left Over Store
And Finishing Accessories**



No apparent lateral stability system was observed in Worker Dining, Left-Over Store and Finishing Accessories. The connections between truss and pipe columns appeared to be inadequate in all those sheds.



Framing system



Rafter-column connection

Observations: Worker Dining



Framing system



Rafter-column connection



Rafter-column connection

Observations: Left Over Store



Framing system



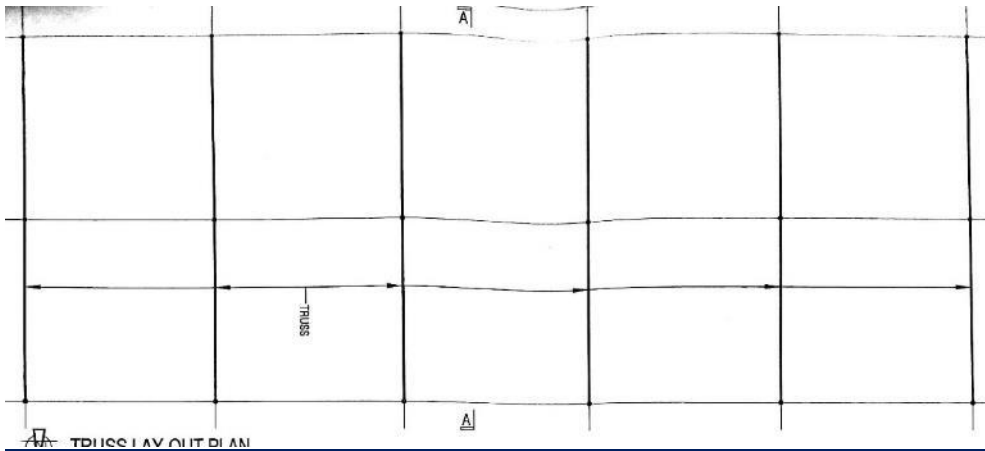
Rafter-column connection



Rafter-column connection



Incomplete as-built drawings



Truss layout plan



Truss framing in the shed

Truss layout plan was provided in the as-built drawing but no truss details was incorporated in it. Anchor bolt details were not matched with provided drawing.



Apparent lack of lateral stability and inadequate connections



Missing load transfer in long direction



Truss-column connection

No apparent lateral stability system was observed in the shed. Also, the connections between truss and pipe columns appeared to be inadequate.

Observations: Wastage Store



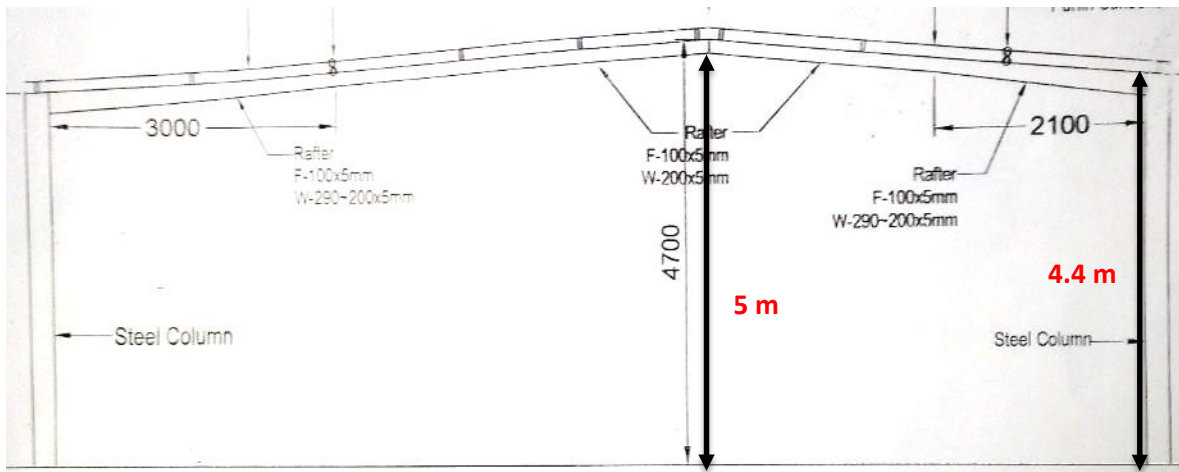
Apparent lack of lateral stability



No apparent stability system (bracing, strut) was observed against lateral loading



Incomplete as-built drawings and connection adequacy check



No anchor bolt details was incorporated in provided as-built drawings. Moreover, section height and grid dimensions mentioned in the provided as built drawing (Shown on the layout) does not match the on site condition.

Column layout plan



No connection detail was provided for most of the connections (Column-rafter, rafter-rafter connections).

Observation : Batch Store



Existence of significant gap between connections

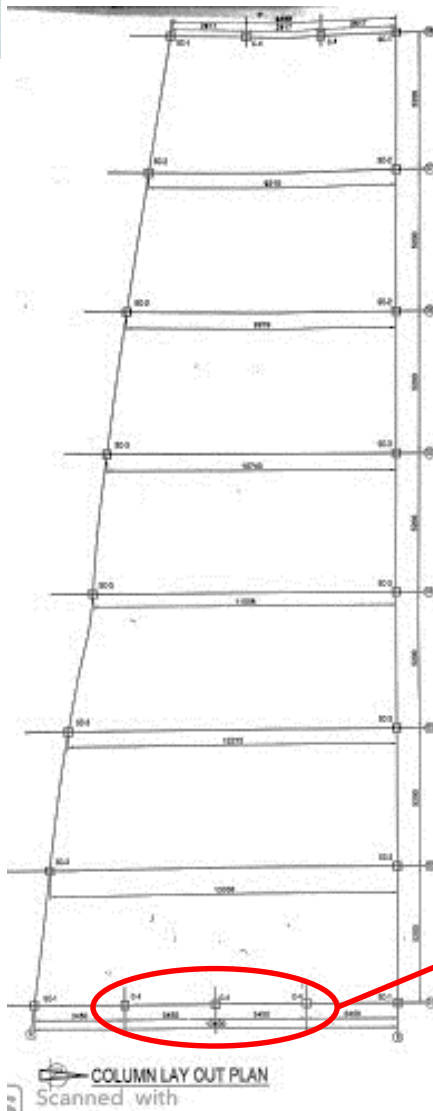
Observations: Batch Store



Existence of significant gap was observed between column-rafter and rafter-rafter connections at several locations.



Damaged rafter at end bay



Column Schedule

| Column Type | Below Ground Floor (R.C) | Above Ground Floor (Steel) |
|-------------|--------------------------|----------------------------|
| SC-1 | | |
| SC-2 | | |
| SC-3 | | |
| C-4 | | |

Column layout plan



Rafter at Grid-1 was found twisted. Some box section was placed on the peripheral wall at Grid-1 to support the rafter.



Apparently non-engineered shed



Light weight roof supported on peripheral wall



Non-engineered connection

Staff Dining is apparently non-engineered shed. Angle rafter is embedded in peripheral brick wall. Building engineer to check the stability of the lightweight roof structure against lateral loading and if inadequate then replace the structure with an engineered one.



Corrosion on steel members



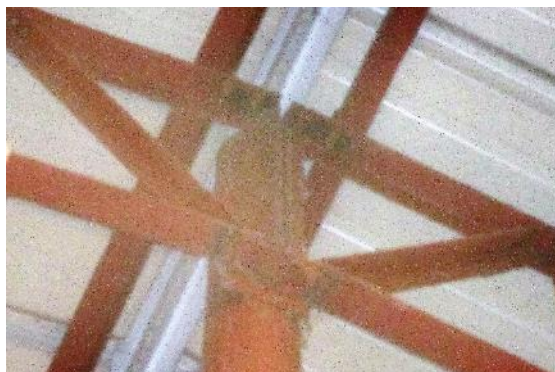
Dyeing shed



Finished Goods Store



Worker Dining



Left-Over Store



Finishing Accessories



Wastage Store



Batch Store

Corrosion was found on columns and rafters of all steel structures.

Observations: All Sheds



Problems Observed

Building-3:

- 01: Discrepancies between as-built drawings and on-site observation.
- 02: Water clogging and lack of drainage system on roof.
- 03: Exposed reinforcements on roof.

Building-4:

- 04: Water clogging and lack of drainage system on roof.
- 05: Cracks under slab soffit & beam.

Dyeing Shed:

- 06: Incomplete as-built drawings.
- 07: Apparent lack of lateral stability.
- 08. Damaged Structural Member and removed beam & walls.
- 09: Adequacy check for steel mezzanine.
- 10: Apparently non-engineered external steel stair.
- 11: Loose cable bracings.

Finished Goods Store:

- 12: Wall bracing missing in long direction .
- 13: Incomplete as-built drawings and connection adequacy check.



Problems Observed

Yarn Store:

14: Incomplete as-built drawings and connection adequacy check.

15: Existence of significant gap between connections.

16: Loose cable bracings.

Worker Dining, Left-Over Store And Finishing Accessories:

17: Apparent lack of lateral stability and inadequate connections.

Wastage Store:

18: Incomplete as-built drawings.

19: Apparent lack of lateral stability and inadequate connections.

Batch Store:

20: Apparent lack of lateral stability.

21: Incomplete as-built drawings and connection adequacy check.

22: Existence of significant gap between connections.

23: Damaged rafter at end bay.

Staff Dining:

24: Apparently non-engineered shed.

All Sheds:

25: Corrosion on steel members.



Priority Action



| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|--|----------------------|
| 1 | Discrepancies between drawings and on-site observation (Building-3) | Building Engineer to survey the whole structure and prepare accurate as-built drawings. | 6-weeks |
| 2 | Water clogging and lack of drainage system on roof (Building-3) | Drainage system on roof slab to be improved. | 6-weeks |
| 3 | Exposed reinforcements on roof (Building-3) | Provide protection to all exposed reinforcement to prevent corrosion. | 6-weeks |
| 4 | Water clogging and lack of drainage system on roof (Building-4) | Water proofing material is required to be provided on roof slab with appropriate sloping and drainage system to be improved. | 6-weeks |
| 5 | Cracks found under slab soffit & beam (Building-4) | Crack investigation report is required to be prepared stating the nature of crack and suggesting proper remedial measures. | 6-weeks |
| 6 | Cracks found under slab soffit & beam (Building-4) | Repair cracks as per recommendation of investigation report. | 6-months |



| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|--|--|----------------------|
| 7 | Incomplete as-built drawings. (Dyeing Shed) | Building Engineer to survey the whole structure and prepare accurate as-built drawings representing actual on-site condition. | 6-weeks |
| 8 | Incomplete as-built drawings. (Dyeing Shed) | Building Engineer to carry out an Engineering Assessment to check connection adequacy. | 6-weeks |
| 9 | Incomplete as-built drawings. (Dyeing Shed) | Implement the recommendation of Engineering Assessment. | 6-months |
| 10 | Apparent lack of lateral stability (Dyeing Shed) | Building Engineer to check the stability of the structure against lateral loading. Also review the bracing system of existing structure. | 6-weeks |
| 11 | Apparent lack of lateral stability (Dyeing Shed) | Building Engineer to carry out an Engineering Assessment to check connection adequacy. | 6-weeks |
| 12 | Apparent lack of lateral stability (Dyeing Shed) | Implement the recommendation of Engineering Assessment. | 6-months |
| 13 | Apparent lack of lateral stability (Dyeing Shed) | Building Engineer to check the stability of the structure against lateral loading. Also review the bracing system of existing structure. | 6-weeks |
| 14 | Apparent lack of lateral stability (Dyeing Shed) | Carry out remedial works if necessary. | 6-months |



| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|--|--|------------------------|
| 15 | Damaged Structural Member and removed beam & walls (Dyeing Shed) | Install adequate support to the overhanging wall. | Immediate - Now |
| 16 | Damaged Structural Member and removed beam & walls (Dyeing Shed) | Building Engineer to check structural adequacy of prop/steel pipe column support. | 6-weeks |
| 17 | Damaged Structural Member and removed beam & walls (Dyeing Shed) | Repair the damaged columns with suitable method as suggested by building engineer. | 6-months |
| 18 | Adequacy check for steel mezzanine (Dyeing Shed) | Building Engineer to check the adequacy of the steel mezzanine for vertical and lateral loading. | 6-weeks |
| 19 | Adequacy check for steel mezzanine (Dyeing Shed) | Building Engineer to prepare the allowable load plans. | 6-weeks |
| 20 | Adequacy check for steel mezzanine (Dyeing Shed) | Carry out remedial works if necessary. | 6-months |
| 21 | Adequacy check for steel mezzanine (Dyeing Shed) | Continue to implement load plan. | 6-months |



| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|---|----------------------|
| 22 | Apparently non-engineered external steel stair (Dyeing Shed) | Building Engineer to check load bearing capacity of external escape stair and to ensure stability. | 6-weeks |
| 23 | Apparently non-engineered external steel stair (Dyeing Shed) | Carry out remedial works if necessary. | 6-months |
| 24 | Loose cable bracings (Dyeing Shed) | Building Engineer to survey the whole structure and tighten loose bracings where necessary. | 6-weeks |
| 25 | Wall bracing missing in long direction (Finished Goods Store) | Building engineer is required to check the existing bracing system of the structure and requirement of bracing for stability. | 6-weeks |
| 26 | Wall bracing missing in long direction (Finished Goods Store) | Carry out remedial works if necessary. | 6-months |
| 27 | Incomplete as-built drawings and connection adequacy check (Finished Goods Store) | Building Engineer to survey the whole structure and prepare accurate as-built drawings. | 6-weeks |
| 28 | Incomplete as-built drawings and connection adequacy check (Finished Goods Store) | Building engineer to check adequacy of the connections. | 6-weeks |
| 29 | Incomplete as-built drawings and connection adequacy check (Finished Goods Store) | Carry out remedial works if necessary. | 6-months |



| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|---|----------------------|
| 30 | Incomplete as-built drawings and connection adequacy check (Yarn Store) | Building Engineer to survey the whole structure and prepare accurate as-built drawings. | 6-weeks |
| 31 | Incomplete as-built drawings and connection adequacy check (Yarn Store) | Building engineer to check the connection adequacy of the joints. | 6-weeks |
| 32 | Incomplete as-built drawings and connection adequacy check (Yarn Store) | Carry out remedial works if necessary. | 6-months |
| 33 | Existence of significant gap between connections. (Yarn Store) | Building engineer to survey the whole structure to locate the gap in joints and take suitable measures. | 6-weeks |
| 34 | Loose cable bracings (Yarn Store) | Building Engineer to survey the whole structure and tighten loose bracings where necessary. | 6-weeks |



| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|--|--|----------------------|
| 35 | Apparent lack of lateral stability and inadequate connections (Worker Dining, Left-Over Store and Finishing Accessories) | Building Engineer to survey the whole structure and prepare accurate as-built drawings. | 6-weeks |
| 36 | Apparent lack of lateral stability and inadequate connections (Worker Dining, Left-Over Store and Finishing Accessories) | Building Engineer to check the lateral stability and connection adequacy of the structure. | 6-weeks |
| 37 | Apparent lack of lateral stability and inadequate connections (Worker Dining, Left-Over Store and Finishing Accessories) | Carry out remedial works if necessary. | 6-months |
| 38 | Incomplete as-built drawings (Wastage Store) | Building Engineer to survey the whole structure and prepare accurate as-built drawings. | 6-weeks |



| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|--|----------------------|
| 39 | Apparent lack of lateral stability and inadequate connections (Wastage Store) | Building Engineer to check the lateral stability and connection adequacy of the structure. | 6-weeks |
| 40 | Apparent lack of lateral stability and inadequate connections (Wastage Store) | Carry out remedial works if necessary. | 6-months |
| 41 | Apparent lack of lateral Stability (Batch Store) | Building Engineer to check the stability of the structure against lateral loading. | 6-weeks |
| 42 | Apparent lack of lateral Stability (Batch Store) | Carry out remedial works if necessary. | 6-months |
| 43 | Incomplete as-built drawings and connection adequacy check (Batch Store) | Building Engineer to survey the whole structure and prepare accurate as-built drawings. | 6-weeks |
| 44 | Incomplete as-built drawings and connection adequacy check (Batch Store) | Building engineer to check the connection adequacy of the joints. | 6-weeks |
| 45 | Incomplete as-built drawings and connection adequacy check (Batch Store) | Carry out remedial works if necessary. | 6-months |



| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|--|---|----------------------|
| 46 | Existence of significant gap between connections. (Batch Store) | Building engineer to survey the whole structure to locate the gap in joints and take suitable measures. | 6-weeks |
| 47 | Damaged rafter at end bay (Batch Store) | Building engineer to check the extent of damage to the rafter and suggest proper remedial measures. | 6-weeks |
| 48 | Damaged rafter at end bay (Batch Store) | Carry out remedial works if necessary. | 6-months |
| 49 | Apparently non-engineered shed (Staff Dining) | Building engineer to check the stability of the lightweight roof structure against lateral loading and if inadequate then replace the structure with an engineered one. | 6-weeks |
| 50 | Apparently non-engineered shed (Staff Dining) | Carry out remedial/alteration works if necessary. | 6-months |
| 51 | Corrosion in steel members (All sheds) | Building engineer to survey all the steel structures to identify the locations of corrosions and take necessary measures to remove corrosion. | 6-weeks |