

KSS Knit Composite Ltd. (Extension Buildings)

Boherar Chala, Sreepur, Maowna
(24.200929, 90.401977)
29 May 2022



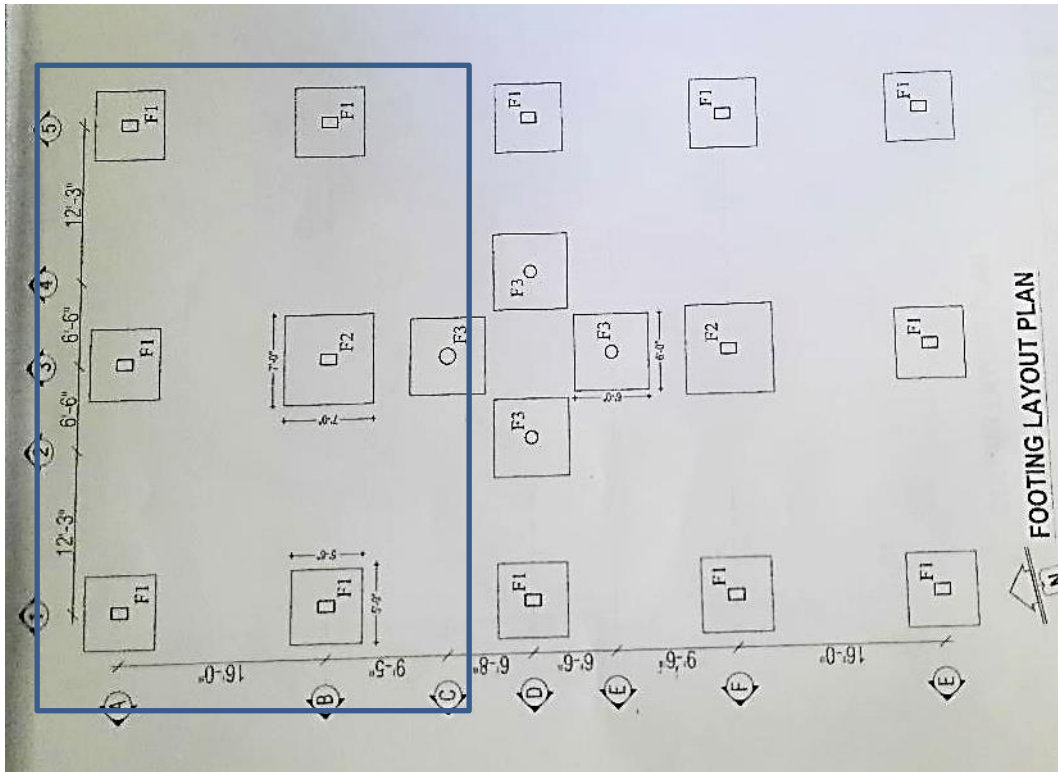
Building Information

1. Office Building (Building-04): Partially four storied (G+3).
2. Utility Building (Building-05): Two storied (G+1).
3. Fire Hydrant Building (Building-06): Five storied (B+G+4) with a semi basement.
4. ETP Building (Building-07): Two storied (G+1).
5. Sewing Thread (Building-08): Two storied (G+1).
6. Warehouse Building (Building-09): Eight storied (B+G+7) with a basement.
7. Dyeing Shed (Building-10): Single storied prefabricated steel structure.

Observations

Preliminary calculations indicate high punching shear stress in footing

Observation: Office Building (Building-04)



| FOOTING SCHEDULE | | | | | | | | | |
|------------------|-----------------|--------------------|-----|----------------|----------------|----|-------|--------------------|--|
| SL. NO. | NAME OF FOOTING | FOOTING SIZE B x L | D | d ₁ | d ₂ | A | DF | ASD | |
| 1 | F1 | 5'-6" x 5'-6" | 15" | 10" | 5" | 8" | 5'-0" | 16mmØ @ 6" c/c b/w | |
| 2 | F2 | 6'-0" x 6'-0" | 15" | 10" | 5" | 8" | 5'-0" | 16mmØ @ 5" c/c b/w | |
| 3 | F3 | 7'-0" x 7'-0" | 15" | 10" | 5" | 8" | 5'-0" | 16mmØ @ 4" c/c b/w | |

The diagrams show a cross-section of a footing (SECTION - A-A) and a plan view of a typical footing. The section shows a footing with a depth of 15 inches, a top width of 10 inches, and a bottom width of 5 inches. It is supported by a brick masonry wall. The plan view shows a rectangular footing with dimensions 5'-6" x 5'-6".

Mat Details

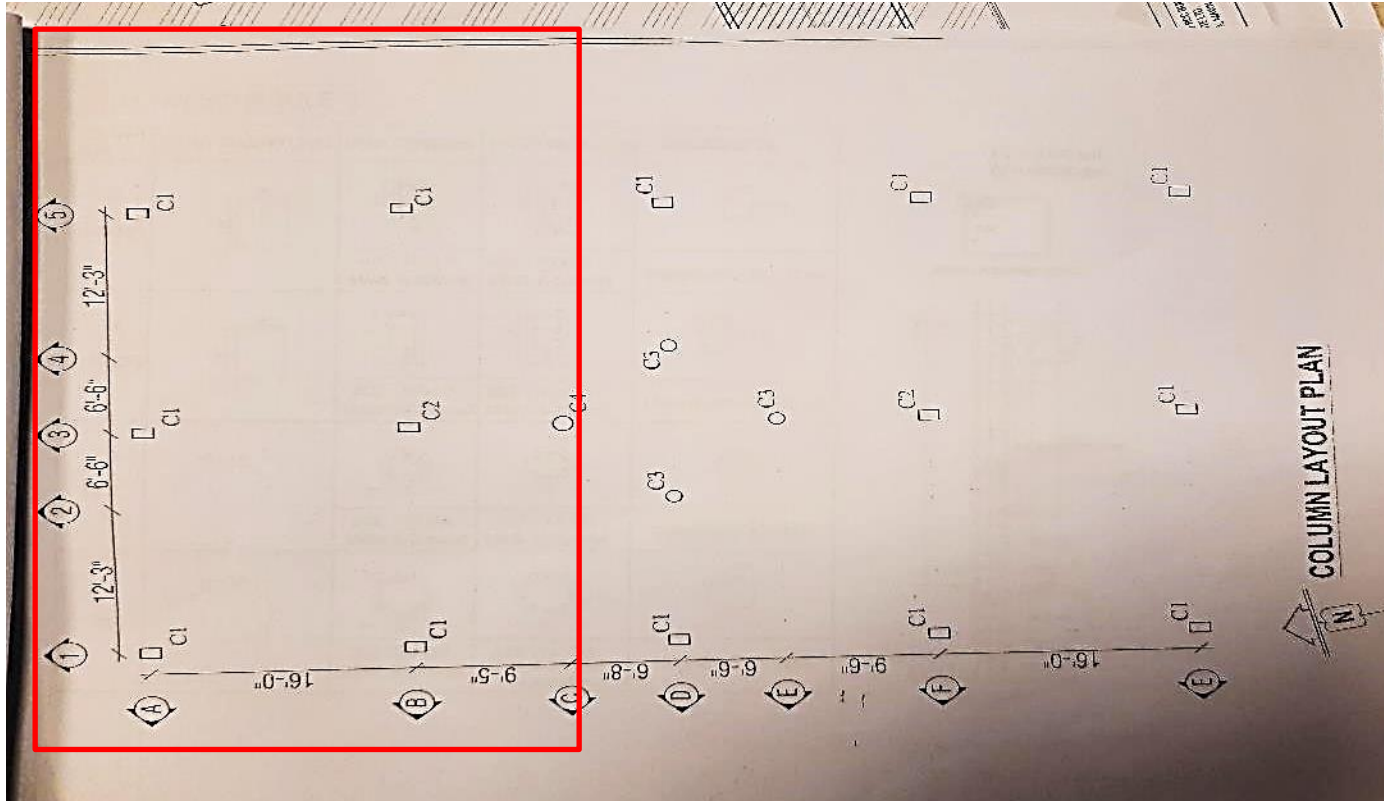
Preliminary calculations indicates high punching shear stresses on the footing considering the minimum concrete strength of brick chips aggregate & prepared live load plan of 3 kPa. A Detail Engineering Assessment is required to carry out by the Building Engineer.



Brick aggregate concrete

Observation: Office Building (Building-04)

Columns are stressed above normal design limit



Brick aggregate concrete

Cursory calculation indicates that the working stress of ground floor column exceeds the normal design limits considering the minimum concrete strength of brick chips aggregate & prepared live load plan of 3 kPa. A Detail Engineering Assessment is required to carry out by the Building Engineer.

Slenderness effect of column

Observation: Utility Building (Building-05)



The ground floor height is 7.0 m and clear height of column is 6.17 m. The least dimension is 300 mm. There is no intermediate tie beam. The building engineer is required to check the slenderness effect of the column.

Observation: Utility Building (Building-05)

Structural design report not available



Onsite typical structural system

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. Design report was not found which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

Vibration at 1st floor

Observation: Utility Building (Building-05)



Generator machine at 1st floor of Utility Building

During inspection, vibration was observed at 1st floor of utility building due to heavy generator machine. The building engineer is required to check the specific reason of the vibration and provide the required suggestion where required.

Structural design report not available



Fire hydrant 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. Design report was not found which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

Observation: Fire Hydrant Building (Building-06)

Dampness in several locations

Observation: Fire Hydrant Building (Building-06)



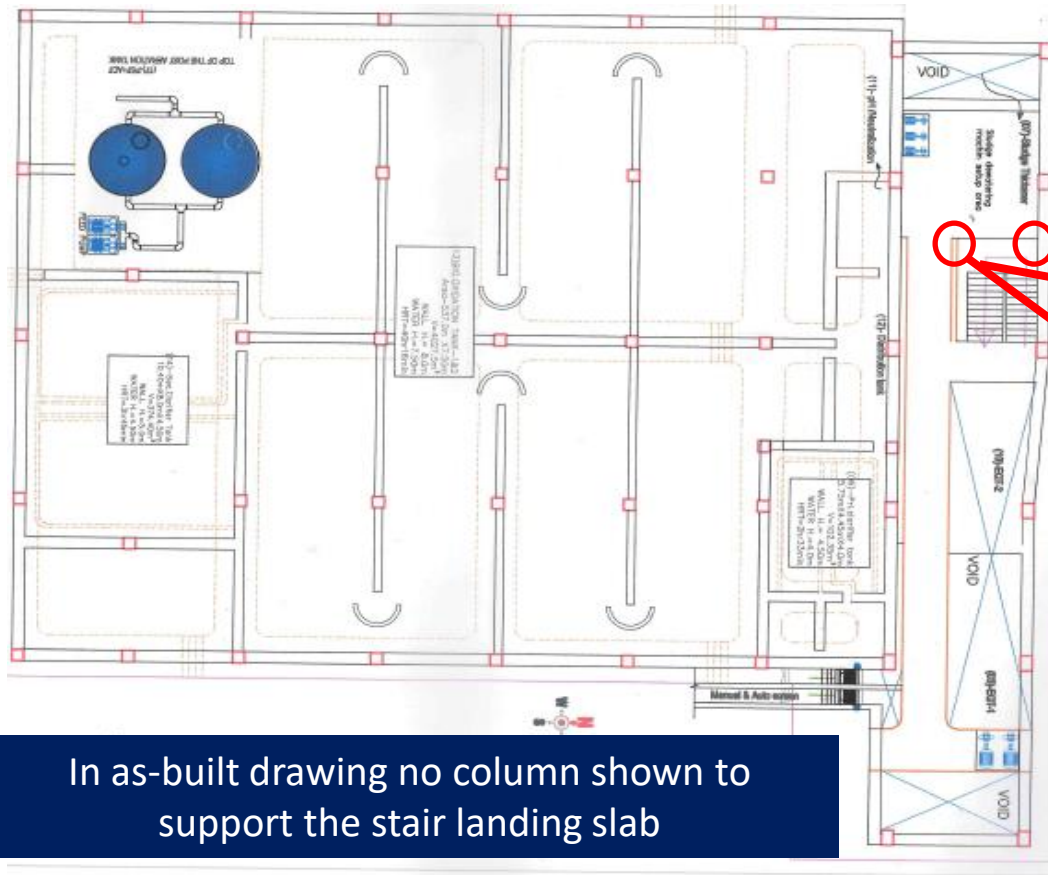
Damp area observed at staircase and several place due to water leakage. Building engineer is required to provide remedial measure to repair the damped areas.

Exposed rebar at roof



Exposed reinforcement was found on roof columns. Building engineer is required to take necessary measures to prevent the corrosion in exposed rebar.

Mismatch found in as-built drawing and questionable vertical load path



In as-built drawing no column shown to support the stair landing slab

No column was shown in as-built drawing to support stair landing slab. But on-site it was found two columns were constructed from the floor beam. Factory Engineer is required to survey the whole structure to prepare accurate as-built drawing and to check the vertical load path of stair columns loads.



Stair landing supported on column which is constructed over floor beam without any foundation.

Crack on façade wall & brick wall



Crack observed on façade wall



Crack observed on brick wall

Cracks were found in several area of the brick walls of the building. Building engineer is required to investigate the cracks, produce investigation report showing extent of cracks and repair methodology. Building is required to repair the cracks as per crack investigation report.

Significant vibration at 1st floor

Observation: ETP Building (Building-07)



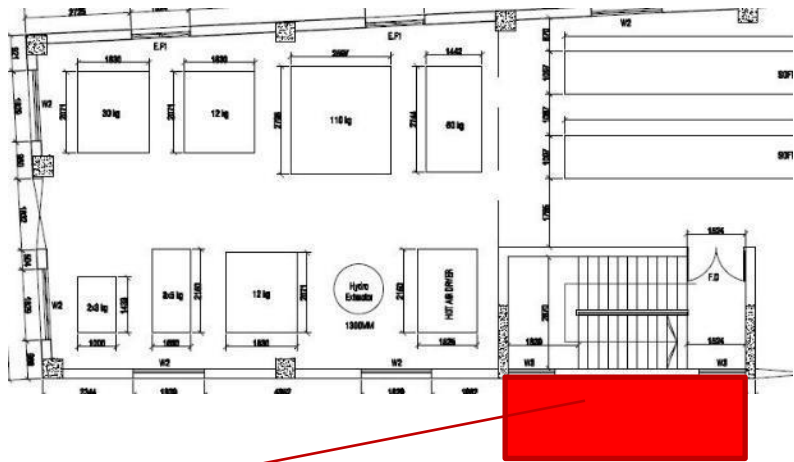
Air blower machine at 1st floor of ETP building

Significant vibration was observed at 1st floor of ETP Building (Building-07) due to operation of air blower machine. Building engineer is required to check the specific reason of the vibration and provide the required suggestion if required.

Observation: ETP Building (Building-07)

Mismatch found in as-built drawing and questionable vertical load path

Not shown in drawing



Marked portion not shown in architectural drawing at ground floor level. Building engineer is required to prepare accurate as-built drawing. Also check the vertical load path of stair loads.

Staircase at ground floor not shown in drawing

27 **Observation: Sewing Thread (Building-08)**

Apparently non-engineered staircase roof



Apparently non engineered steel roof shed was found over the stair case. Building engineer is required to check the stability of the roof.

Falling hazard due to poor connection of exposed rebar



Some exposed rebars were found which are poorly connected to tie bar. Building engineer is required to take remedial action regarding this issue immediately.

Stair railing, parapet wall and lintel found missing



Missing stair railing



Missing parapet wall

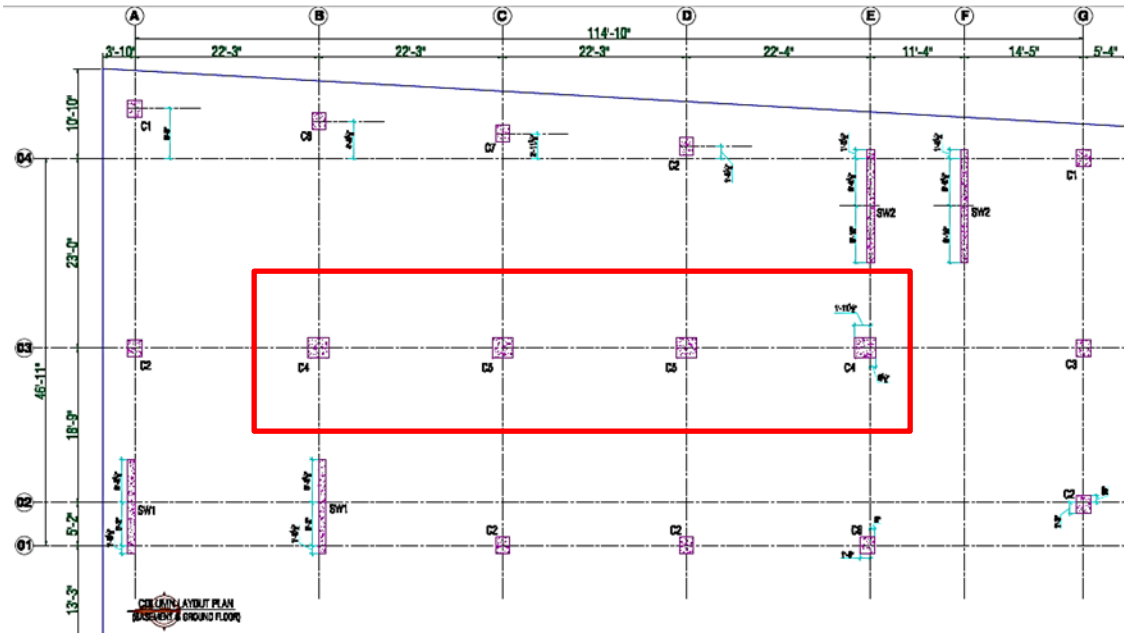


Missing lintel

Building engineer is required to provide adequate prevention to avoid falling hazard issue.

Observation: Sewing Thread (Building-08)

Columns are stressed above normal design limit



Cursory calculation indicates that the working stress of ground floor column exceeds the normal design limits considering the minimum concrete strength of stone chips aggregate & prepared live load plan of 6 kPa. The building engineer is required to review the design, load and column stress.



6 kPa Live Load

Observation: Warehouse Building (Building-09)

Uncontrolled loading on 5th floor



Uncontrolled stack of yarn observed at the 5th floor of the warehouse building. Building engineer is required to establish a proper load management system to avoid any kind of fallen of stack over anyone. Also, load restriction height is required to marked in the storage area.

Uncontrolled yarn store at 5th floor

Observation: Warehouse Building (Building-09)

**Exposed rebar, standing water and
construction debris on the roof**



Standing water on roof



Exposed rebar

Standing water on the roof observed due to lack of proper sloping and drainage system. Exposed rebar also found on the roof as well as construction debris not removed from roof (although construction work is completed).



Construction debris on roof



Building Engineer is required to provide proper slope on roof and to developed drainage system to avoid water clogging in future as well as to remove excess exposed rebar & construction debris from the roof.

Falling hazard from stair and unrestrained brick walls



Stair without handrail



No window grill installed at stair

No handrail and window grill observed at the stair of the warehouse. As well as unrestrained brick wall found in the stair due to installation of fire hydrant pipe line.



Unrestrained brick wall at stair without lintel/support.



Building Engineer is required to provide proper handrail in the stair and to install grill in the window to avoid falling hazard. Factory is also required to provide proper support below the unrestrained brick wall.

Storage racks found without bracing/anchored



Storage rack without bracing and not anchored

Non-structural storage racks were not anchored or braced properly with floor or slab to protect against the earthquake load. Building is required to install bracing or anchor the rack with floor properly to make it stable against the earthquake load.

Possibility of impact of vehicle on column



Ground Floor Column at Parking

No column guard provided to protect the ground floor column from the vehicle impact. Building engineer is required to install column guard around the column to avoid the vehicle impact.

Lack of lateral stability



No compression strut along the length of building



No compression strut or vertical bracing
at end bay

No compression strut or vertical bracing
found in the long direction of the shed.
Building engineer is required to check
the lateral stability of the shed.

Observation: Dyeing Shed (Building-10)

Loose and inactive cable bracing



Loose and inactive cable bracing

Loose and inactive cable bracing was observed in roof of the shed. Building engineer is required to tightened the bracing

Observation: Dyeing Shed (Building-10)

Corrosion on steel member



Corrosion on steel member

Corrosion was observed in the steel column of the shed. Building engineer is required to take proper measures to remove the corrosion from the steel column.

Missing bolt



Missing bolt in steel column
and rafter joint



Building is required to install the missing bolt of the
steel structure.

Priority Actions

Problems Observed

Office Building (Building-04)

Item 01: Preliminary calculations indicate high punching shear stress in footing.

Item 02: Columns are stressed above normal design limit.

Utility Building (Building-05):

Item 03: Slenderness effect of column.

Item 04: Structural design report not available.

Item 05: Vibration at 1st floor.

Fire Hydrant Building (Building-06):

Item 06: Structural design report not available.

Item 07: Dampness in several locations.

Item 08: Exposed rebar at roof floor.

ETP Building (Building-07)

Item 09: Mismatch found in as-built drawing and questionable vertical load path.

Item 10: Crack on façade wall & brick wall.

Item 11: Significant vibration at 1st floor.

Sewing Thread (Building-08)

Item 12: Mismatch found in as-built drawing and questionable vertical load path.

Item 13: Apparently non-engineered staircase roof.

Item 14: Falling hazard due to poor connection of exposed rebar.

Item 15: Stair railing, Parapet wall and lintel found missing.

Warehouse Building (Building-09)

Item 16: Columns are stressed above normal design limit.

Item 17: Uncontrolled loading on 5th floor.

Item 18: Exposed rebar, standing water and construction debris on roof.

Item 19: Falling hazard from stair and unrestrained brick wall.

Item 20: Storage racks found without bracing / not anchored.

Item 21: Possibility of impact of vehicle on column.

Dyeing Shed (Building-10):

Item 22: Lack of lateral stability.

Item 23: Loose and inactive cable bracing.

Item 24: Corrosion on steel member.

Item 25 : Missing bolt.

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|--|--|----------------------|
| 01 | Preliminary calculations indicate high punching shear stress in footing. (Building-04) | Building Engineer to review design, loads and punching shear stresses. | Immediate - Now |
| 02 | Preliminary calculations indicate high punching shear stress in footing. (Building-04) | Verify in-situ concrete strengths (using 100mm dia. cores min 4 nos). | Immediate - Now |
| 03 | Preliminary calculations indicate high punching shear stress in footing. (Building-04) | A Detail Engineering Assessment to be commenced. | Immediate - Now |
| 04 | Preliminary calculations indicate high punching shear stress in footing. (Building-04) | Produce and actively manage a loading plan for all floor plates considering foundation, floor and column capacity. | 6-weeks |
| 05 | Preliminary calculations indicate high punching shear stress in footing. (Building-04) | Detail Engineering Assessment to be completed. | 6-weeks |
| 06 | Preliminary calculations indicate high punching shear stress in footing. (Building-04) | Carry out remedial works where required. | 6-months |

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|--|---|----------------------|
| 07 | Preliminary calculations indicate high punching shear stress in footing. (Building-04) | Continue to implement load plan. | 6-months |
| 08 | Columns are stressed above normal design limit. (Building-04) | Building Engineer to review design, loads and column stresses. | 6-weeks |
| 09 | Columns are stressed above normal design limit. (Building-04) | Produce and actively manage a loading plan for all floor plates considering foundation, floor and column capacity. | 6-weeks |
| 10 | Columns are stressed above normal design limit. (Building-04) | Continue to implement load plan. | 6-months |
| 11 | Columns are stressed above normal design limit. (Building-04) | Carry out remedial works where required. | 6-months |
| 12 | Slenderness effect of column. (Building-05) | Building engineer is required to check the slenderness effect of the column as part of Engineering Assessment (EA). | 6-weeks |

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|---|----------------------|
| 13 | Slenderness effect of column. (Building-05) | Carry out remedial works where required. | 6-months |
| 14 | Structural design report not available. (Building-05) | Building engineer is required to be prepared design documents in compliance with section 1.9.1.1 (part-6, BNBC). | 6-weeks |
| 15 | Structural design report not available. (Building-05) | Carry out remedial works where required. | 6-months |
| 16 | Vibration at 1st floor. (Building-05) | Building engineer is required to check the specific reason of the vibration and provide the required suggestion where required. | 6-weeks |
| 17 | Vibration at 1st floor. (Building-05) | Carry out remedial works as per the engineers' suggestion. | 6-weeks |
| 18 | Structural design report not available. (Building-06) | Building engineer is required to be prepared design documents in compliance with section 1.9.1.1 (part-6, BNBC). | 6-weeks |

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|---|----------------------|
| 19 | Structural design report not available. (Building-06) | Carry out remedial works where required. | 6-months |
| 20 | Dampness in several locations. (Building-06) | Building engineer is required to provide remedial measure to repair the damped area. | 6-weeks |
| 21 | Exposed rebar at roof floor. (Building-06) | Building engineer is required to take necessary measures to prevent the corrosion in exposed rebar. | 6-weeks |
| 22 | Mismatch found in as-built drawing and questionable vertical load path. (Building-07) | Building engineer is required to prepare accurate as-built drawing. | 6-weeks |
| 23 | Mismatch found in as-built drawing and questionable vertical load path. (Building-07) | Check the vertical load path of staircase load and suggest remedial actions. | 6-weeks |
| 24 | Mismatch found in as-built drawing and questionable vertical load path. (Building-07) | Implement suggested remedial actions (if required). | 6-months |

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|--|----------------------|
| 25 | Crack on façade wall & brick wall. (Building-07) | Building engineer is required to investigate the cracks, produce investigation report showing extent of cracks and repair methodology. | 6-weeks |
| 26 | Crack on façade wall & brick wall. (Building-07) | Building is required to repair the cracks as per crack investigation report. | 6-weeks |
| 27 | Significant vibration at 1st floor. (Building-07) | Building engineer is required to check the specific reason of the vibration and provide the required suggestion if required. | 6-weeks |
| 28 | Significant vibration at 1st floor. (Building-07) | Carry out remedial works where required. | 6-weeks |
| 29 | Mismatch found in as-built drawing and questionable vertical load path. (Building-08) | Check the vertical load path of staircase load and suggest remedial actions. | 6-weeks |
| 30 | Mismatch found in as-built drawing and questionable vertical load path. (Building-08) | Implement suggested remedial actions (if required). | 6-months |

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|---|----------------------|
| 31 | Apparently non-engineered staircase roof. (Building-08) | Building engineer is required to check the stability of the roof structure over staircase. | 6-weeks |
| 32 | Apparently non-engineered staircase roof. (Building-08) | Carry out remedial works where required. | 6-months |
| 33 | Falling hazard due to poor connection of exposed rebar. (Building-08) | Building engineer is required to provide adequate preventive measure to avoid potential falling hazard. | 6-weeks |
| 34 | Stair railing, parapet wall and lintel found missing. (Building-08) | Building Engineer is required to provide proper handrail in the stair and to install grill in the window to avoid falling hazard. | 6-weeks |
| 35 | Stair railing, parapet wall and lintel found missing. (Building-08) | Building engineer is also required to provide proper support below the unrestrained brick wall. | 6-weeks |
| 36 | Columns are stressed above normal design limit. (Building-09) | Building Engineer to review design, loads and column stresses. | 6-weeks |

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|--|---|----------------------|
| 37 | Columns are stressed above normal design limit. (Building-09) | Verify in-situ concrete strengths (using 100mm dia. cores min 4 nos from columns). | 6-weeks |
| 38 | Columns are stressed above normal design limit. (Building-09) | Produce and actively manage a loading plan for all floor plates considering floor and column capacity. | 6-weeks |
| 39 | Columns are stressed above normal design limit. (Building-09) | Carry out remedial works where required. | 6-months |
| 40 | Columns are stressed above normal design limit. (Building-09) | Continue to implement load plan. | 6-months |
| 41 | Uncontrolled loading on 5th floor. (Building-09) | Building engineer is required to establish a proper load management system to avoid any kind of fallen of stack over anyone. Also, provide load restriction height marking in the storage area. | 6-weeks |
| 42 | Exposed rebar, standing water and construction debris on the roof. (Building-09) | Building Engineer is required to provide proper slope on roof and to developed drainage system to avoid water standing in future. | 6-weeks |

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|--|---|----------------------|
| 43 | Exposed rebar, standing water and construction debris on the roof. (Building-09) | Remove excess exposed rebar & construction debris from the roof. | 6-weeks |
| 44 | Falling hazard from stair and unrestrained brick walls. (Building-09) | Building Engineer is required to provide proper handrail in the stair and to install grill in the window to avoid falling hazard. | 6-weeks |
| 45 | Falling hazard from stair and unrestrained brick walls. (Building-09) | Building is also required to provide proper support below the unrestrained brick wall. | 6-weeks |
| 46 | Storage racks found without bracing/anchored. (Building-09) | Building is required to install bracing or anchored the rack with floor properly to make it stable against the earthquake load. | 6-weeks |
| 47 | Possibility of impact of vehicle on column. (Building-09) | Building engineer is required to install column guard around the column to avoid the vehicle impact. | 6-weeks |
| 48 | Lack of lateral stability. (Building-10) | Building engineer is required to check the lateral stability of the shed and suggest proper remedial actions. | 6-weeks |

| Item No. | Observation | Recommended Action Plan | Recommended Timeline |
|----------|---|---|----------------------|
| 49 | Lack of lateral stability. (Building-10) | Carry out remedial works where required. | 6-months |
| 50 | Loose and inactive cable bracing. (Building-10) | Building engineer is required to tightened the loose bracing and take proper action to active the bracings. | 6-weeks |
| 51 | Corrosion on steel member. (Building-10) | Building engineer is required to remove the corrosion and apply protective coating to the steel members. | 6-weeks |
| 52 | Missing bolt. (Building-10) | Building is required to re-install the missing bolt as per the specification. | 6-weeks |
| | | | |
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Survey Limitations and Assumptions

This report is for the private and confidential use of RSC for whom it was prepared together with their professional advisors as appropriate. It should not be reproduced in whole or in part or relied upon by third parties for any use without the express written permission of RSC.

This report can be used in discussion with the supplier or factory owner as a means to rectify or address any observations made. The report is not comprehensive and is limited to what could be observed during a visual inspection of the building.

This Report is not intended to be treated as a generalised inspection and does not cover the deterioration of structural members through dampness, fungal or insect attack, nor does it deal with problems and defects of a non-structural nature. Other non structural aspects of the building such as fire safety have not been assessed in this survey.

Except as otherwise noted, drains and other services were not viewed or tested during our inspection and are therefore similarly excluded from this Report. We have not inspected any parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.

External inspection of the façade walls has generally been carried out from ground level only by visual sighting. No opening up works were carried out (except as noted) and we rely on the Architects and Engineers drawings provided to us for our views on concealed parts of the structure and in particular foundations. Strengths of materials and components are untested and we recommend that the factory owners Building Engineer carries out in situ testing over and above those suggested to satisfy themselves with the material strengths and component details.

Recommendations, where given, are for the purpose of providing indicative advice only, are not exhaustive, relate solely to identifying key and obvious structural defects as identified in this presentation, and do not take the form of or constitute a specification for works. We take no responsibility for the works as constructed. This report does not interfere with the factory owners Building Engineers responsibility for the structural performance of this building, The Building Engineer remains fully responsible for the structural adequacy of the building.

This report does not comment in detail on the future seismic performance of the building and only highlights the fact that the building may experience significant damage or collapse in a seismic event along with many others in the Dhaka region.

The observations in this report are based on the Engineering Judgement of the lead surveyor/engineer at the time of the survey. We assume in making these observations that no covering up of faults defects, filling or plastering over cracking or significant repair work has been carried out by the building owner. Any future alteration or additional work by the building owner will void this report.