Category Green

Shafi Knit Ltd.

Natun Para, Baipail (beside DEPZ-2), Ashulia, Savar, Dhaka
(23.945646N, 90.277794E)
12th May 2019

Structural Inspection Report

Observations & Actions

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Reviewed by: Mohammed Shafiq Uddin
Approved by: Mohammed Shafiq Uddin

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Executive Summary

On 12th May 2019 Maruf Zindanee & U.S.M. Dilruba Mahmud of Stichting Bangladesh ACCORD foundation carried out a visual structural survey of **Shafi Knit Ltd** at the address and coordinates given on the cover page of this report.

We met **Shafi Knit Ltd** management including Md. Tipu Sultan (Managing Director), Md. Shahab Uddin (Manager- Admin, HR & Compliance), Md. Minhazul Abedin (Asst. Manager- Accounts), Md. Asraful Islam (Sr. Compliance Officer) and many more.

The factory comprises three structures named Main Building, Shed-1 & Shed-2. The whole premises is owned by **Shafi Knit Ltd.** We were allowed access to whole premises for inspection.

Main Building is a partially five storied reinforced concrete building. Currently, the structure is being used for Cutting section, Fabric Ware House, Accessories Store & Admin Office (Ground Floor), Finishing Section, Inspection Room, Spot Removing Room & Boiler (1st floor), Sewing Section, Maintenance Room (2nd floor), Sewing Section, Production Office (3rd floor) and Prayer Room (Roof). There are 4-2000 liters and 1-500 liters plastic water tanks on the roof top. The building was constructed in two phases. The first phase of construction started in January 2009 and ended in January 2010 up to 2nd floor. Second phase of construction started July 2015 and ended in March 2016 up to roof top shed. The factory occupied the structure since December 2010.

Shed-1 is a single storied steel shed which is being used for Dining, Canteen, Godown, Sample, Medical & Childcare.

Shed-2 is a single storied steel shed which is being used for Generator & Transformer.

Executive Summary (Continued)

The sheds were constructed between January 2009 and January 2010. The sheds were occupied since December 2010.

We were provided with copies of permit drawings for 8-storied Industrial Building dated 14th May 2015 from Local Authority (Savar Cantonment Board). We were also provided with copies of industrial layout drawings dated 1st March 2017 from Department of Inspection for Factories and Establishments (DIFE) for the premises.

We were also presented with:

- Copies of Architectural & Structural drawings and load plan for partial 5-storied Main Building prepared by "Auspicious" dated October 2018.
- Copies of core test reports.
- A set of soil investigation reports was provided for the premises dated July 2007 prepared by The Geo-Engineers. The report recommends shallow foundation based on samples taken from 13 boreholes.

We have checked the column capacity considering 3 kPa live load on typical floor and 1.5 kPa on roof of RC buildings.

Executive Summary (Continued)

A level of non exhaustive list of concerns are:

Main Building:

01: Discrepancies between provided drawings and on-site condition.

02: Load plan & design reports required to be revised and submitted to Accord for further review.

03: Apparent non-engineered Shed at roof without as-built documentation.

Shed 1& 2:

04: Lack of as-built documents.

05: Significant gap between steel baseplate and RCC column of Shed-1.

We see no reason to suspend operations in the facility due to structural concerns (subject to the required actions noted in this report)

Further actions with associated priorities and timeframes are given at the end of this report. Please note that these actions should be completed as soon as practically possible and certainly within the time frame noted.

We have reviewed the property from an outline seismic perspective and would consider that the building, along with many others in the Dhaka region, to be at significant risk of damage in a major Seismic event.

Our Limitations and Assumptions are also noted at the end of this report.

Building Extents

Coordinates- (23.945646N, 90.277794E)

Shafi Knit -Factory Site Location

Building Extents

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North Elevation

West & South Elevation

West Elevation

Building Extents: Main Building

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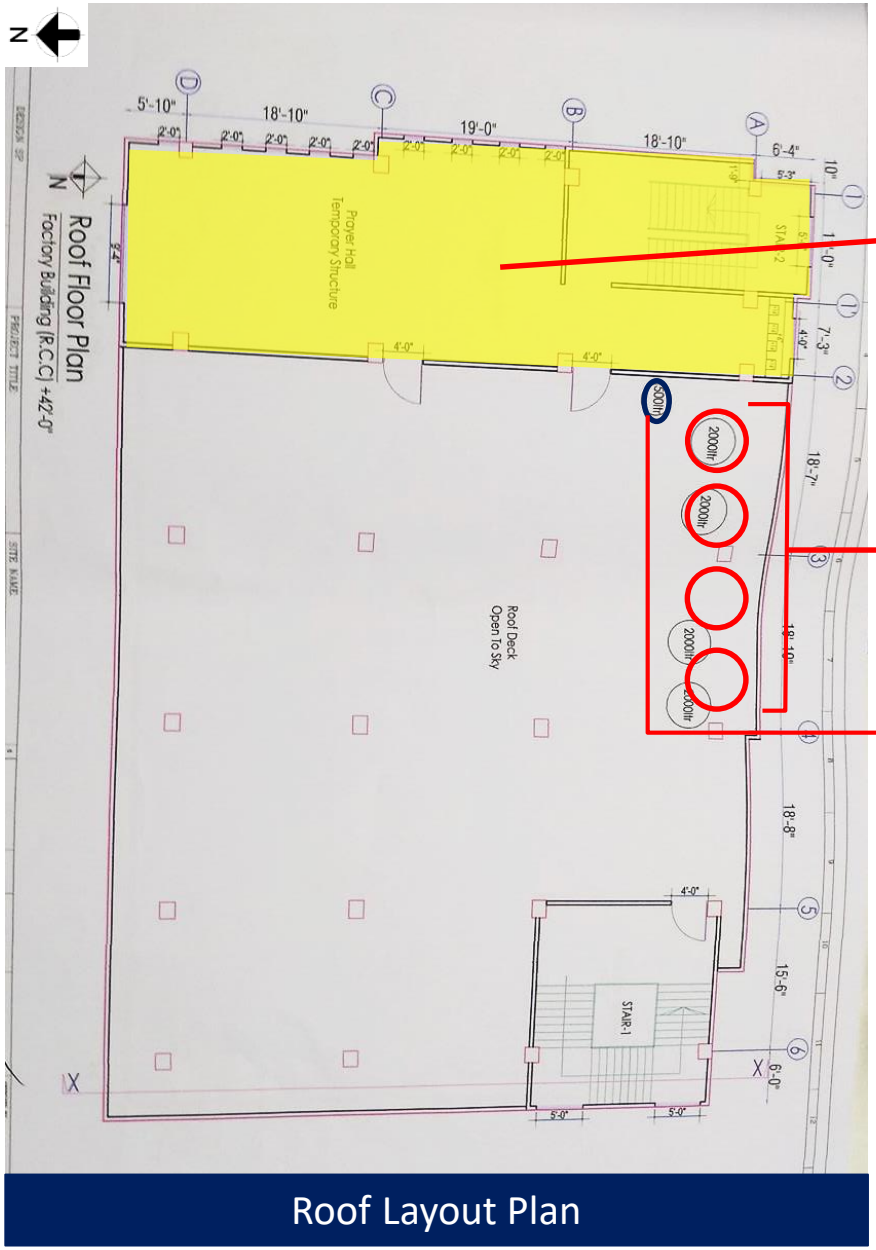

Roof Layout Plan

Prayer Shed

4-2000 liters and 1-500 liters plastic water tanks on roof

Building Extents: Main Building

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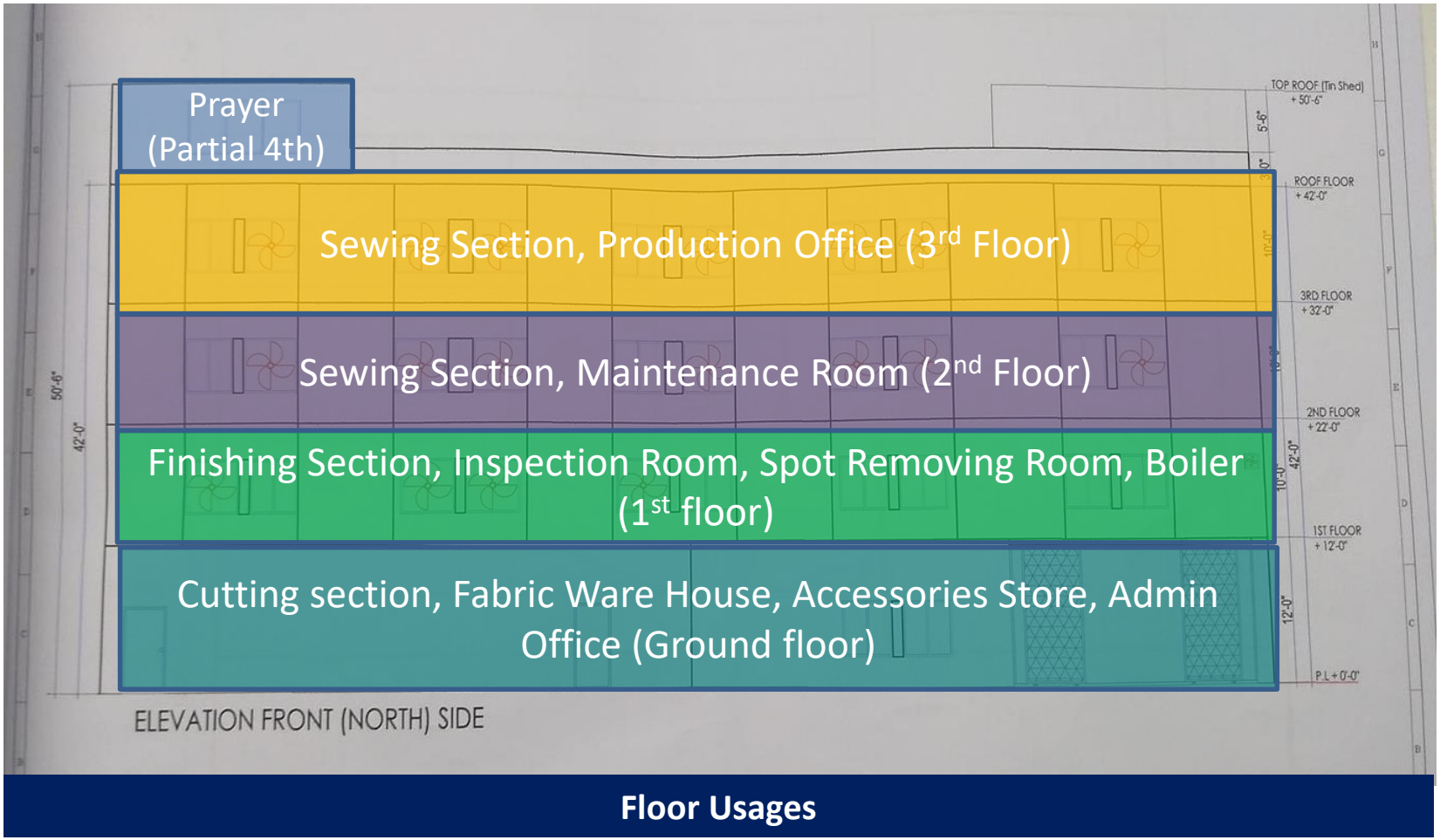

Building Extents: Main Building

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West Elevation

Aerial View

North Elevation

Building Extents: Shed-1

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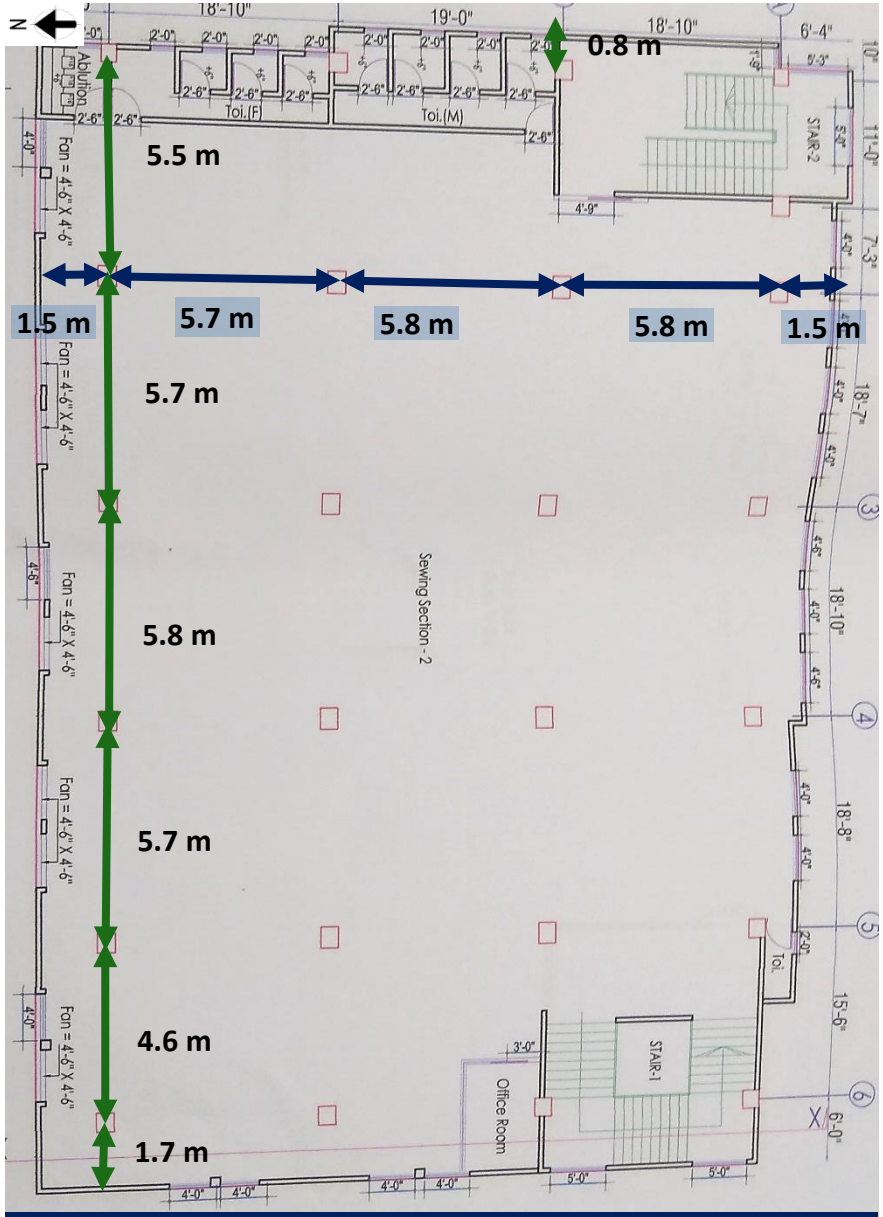
West & South Elevation

Building Extents: Shed-2

Structural System



Floor Layout

Framing System:
RC beam and column frame with 2 way spanning slab

Stability System:
Moment resisting frame system

Maximum Grid: 5.8 m x 5.8 m

Column sizes:
Internal– 450 mm X 550 mm
External – 450 mm X 500 mm

Beam Size: (Longitudinal & Transverse)
300 mm (w) x 300 mm (d/s) (Roof Floor beam)
300 mm (w) x 200 mm (d/s) (1st to 3rd Floor beams)

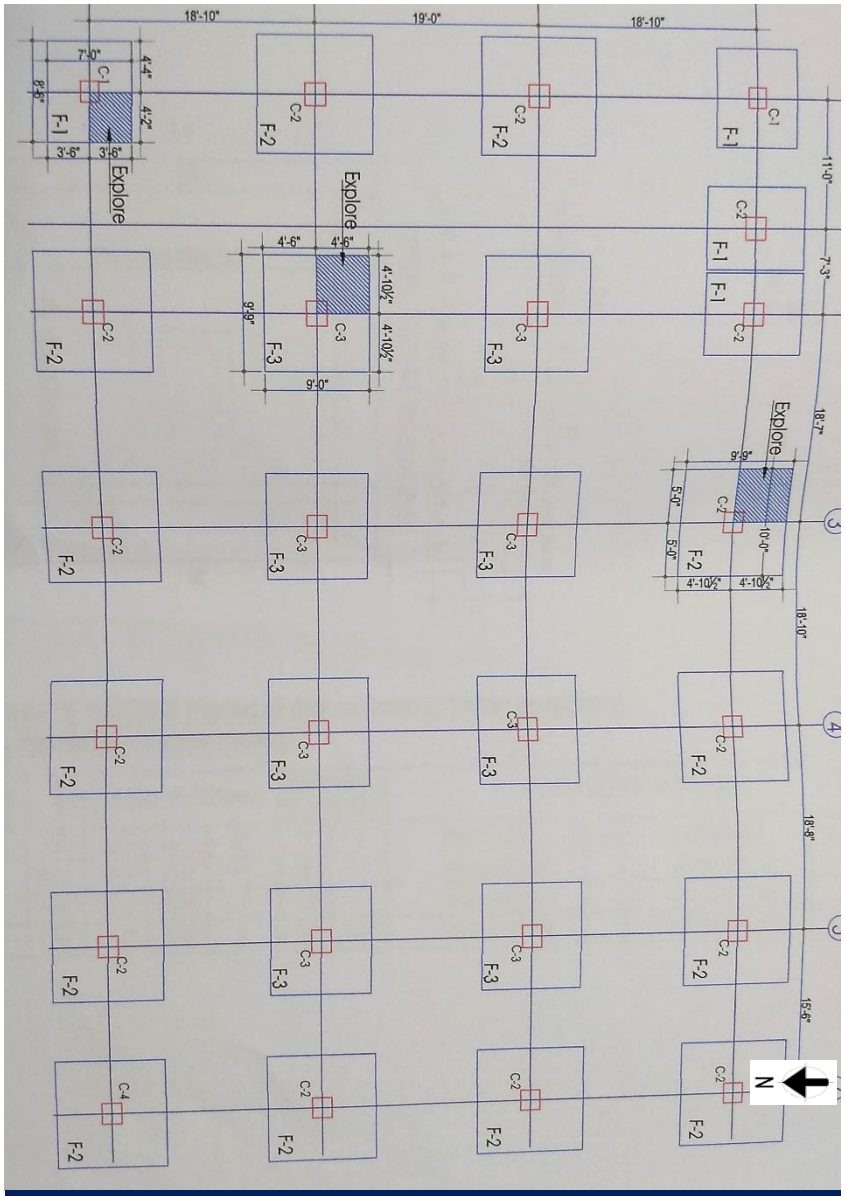
Slab thickness: 150 mm (excluding finishes)

Aggregate Type: Stone Chips

Floor to Ceiling Height: 3.037 m (Average)

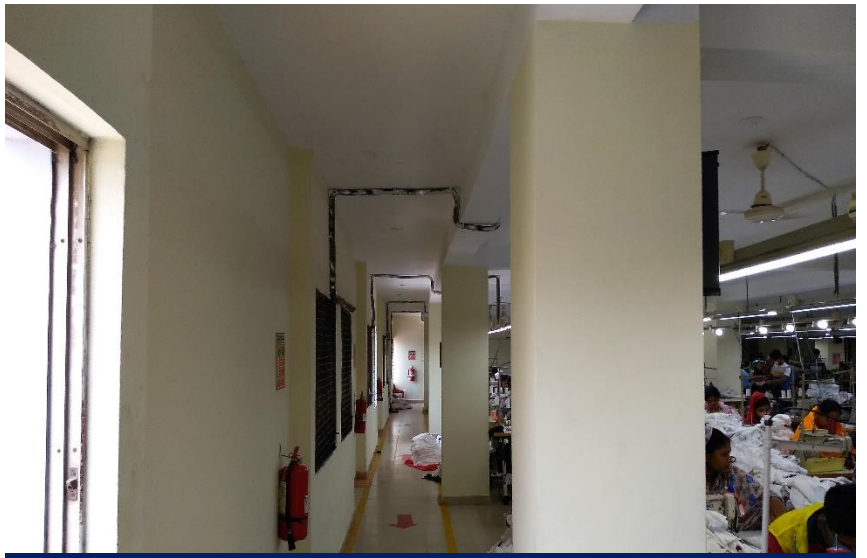
Foundations: Isolated Footing as per drawing

Structural System: Main Building



Foundation Layout (Isolated Footing)

Beam-column frame system



Cantilever Areas

Structural System: Main Building

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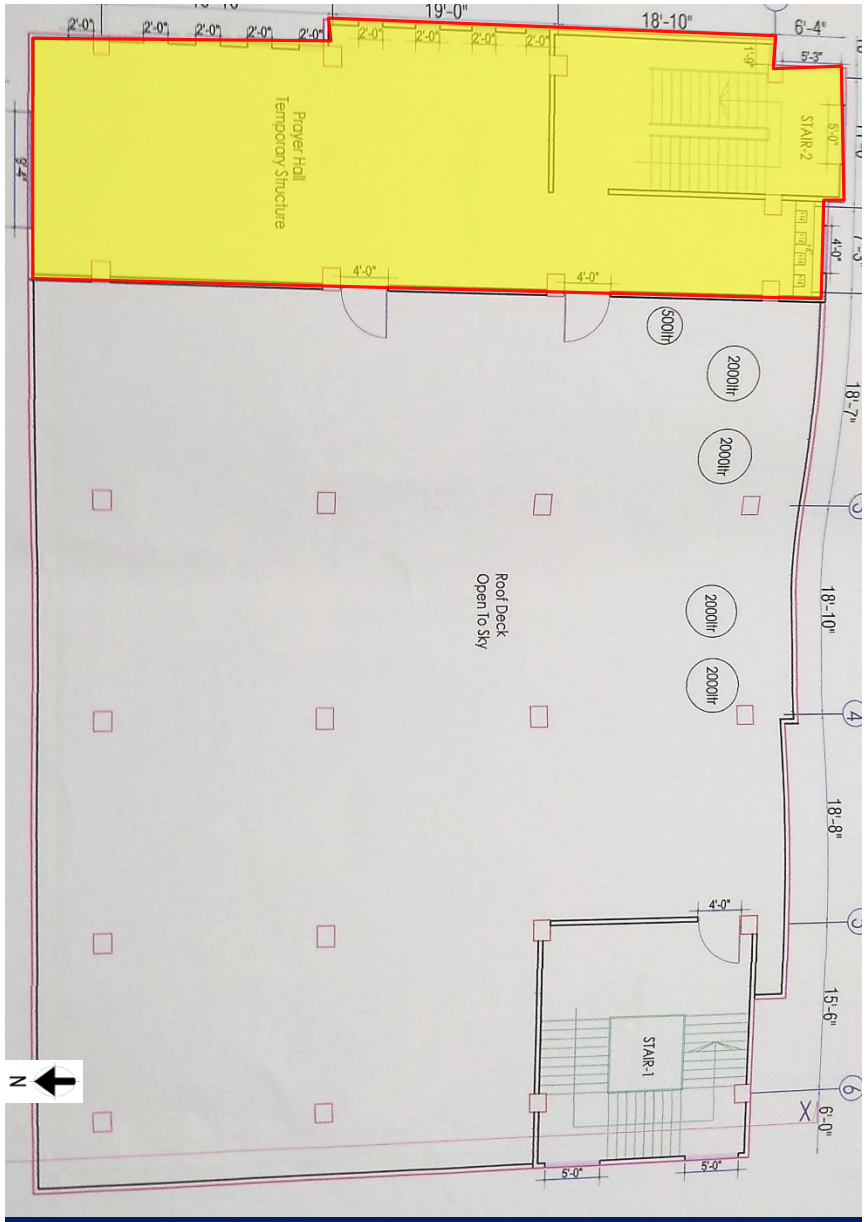
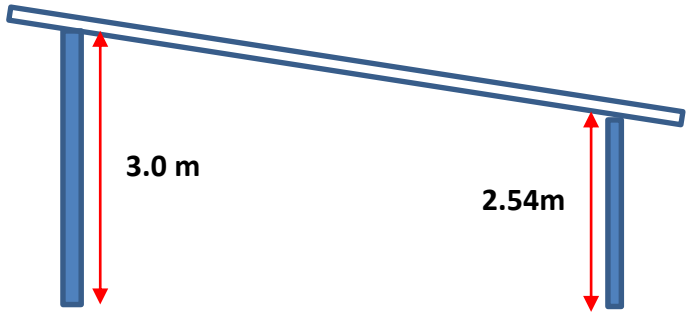


Roof Floor Layout



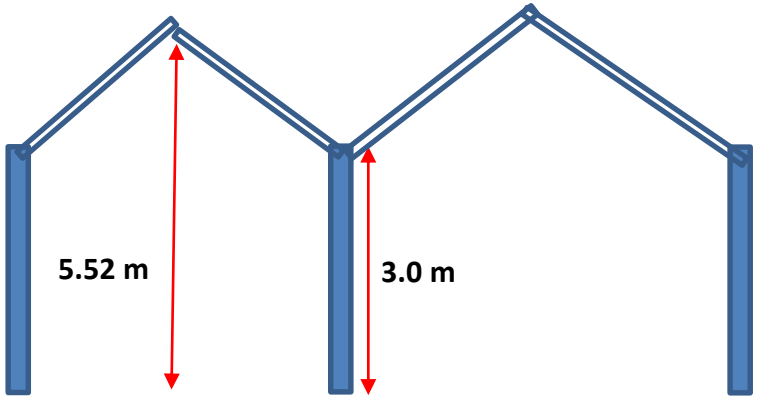
Section of Prayer Shed

Column sizes:
Internal– 450 mm X 550 mm
External – 450 mm X 500 mm

Rafter Size (mm): C 75 X 38 X 3

Prayer shed

Structural System: Main Building (Temporary Roof Shed)



Sectional View

Rafter-column Connection

Structural system:

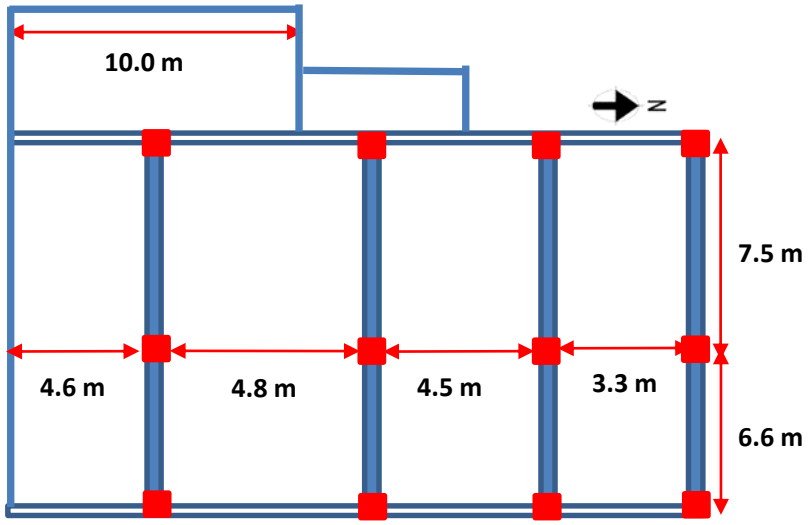
Steel rafter supported on column.

RC Column size: 250mm x 250mm

Rafter size- I-section (mm):

Internal - F 75 (5); W 170

End- F 40 (4); W 100



Rafter Layout

Internal framing system

Structural System: Shed-1

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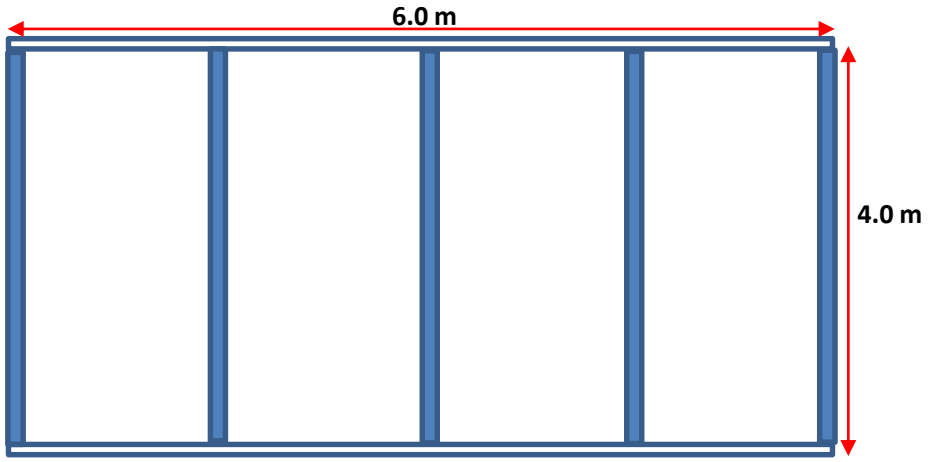
Rafter-column Connection



Rafter Layout

Internal framing system

Structural system:

Steel rafter supported on wall.

RC Column size: 250mm x 250mm

Rafter size: 40mm box

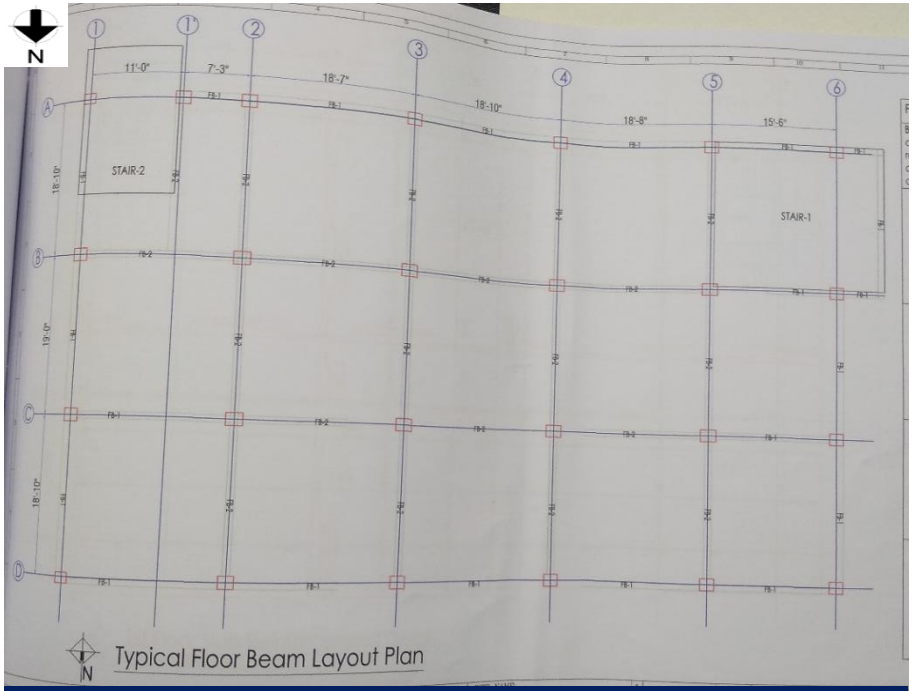
Aggregate Type: Brick Chips

Structural System: Shed-2

Observations

Discrepancies between provided drawings and on-site condition

Observations: Main Building



Typical floor beam layout

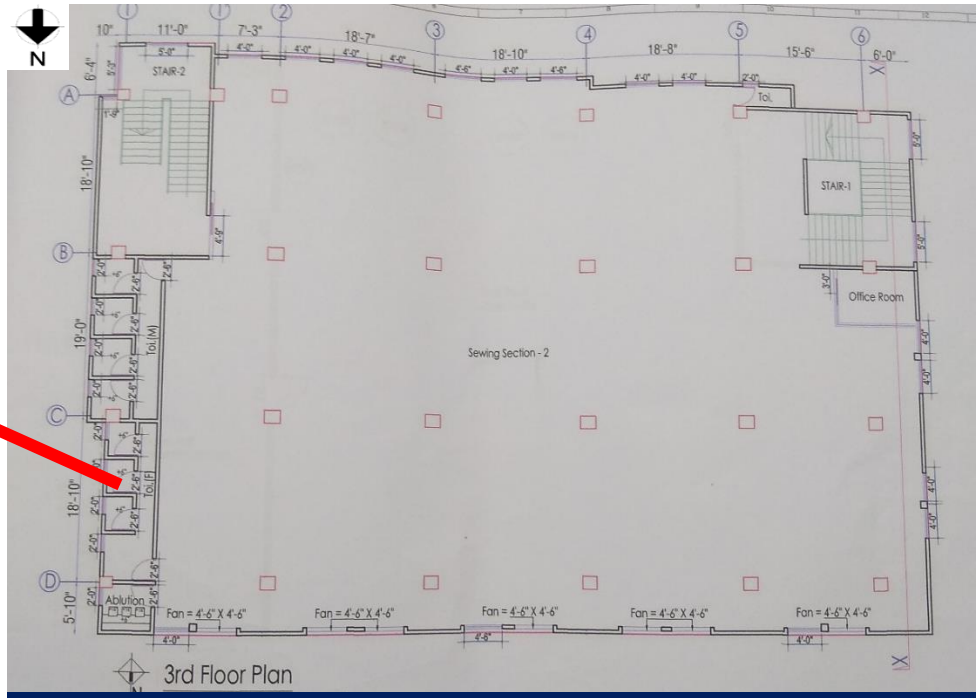
Cantilever beam on roof floor beam

Cantilever beams were found only at 3rd floor roof. A Typical Floor Beam Layout Plan shows cantilever beams. In addition, beam down stand was measured 200 mm instead of 250 mm (as per provided as-built drawing) at 1st to 3rd floor beams.

Observations: Main Building

Toilet Zone

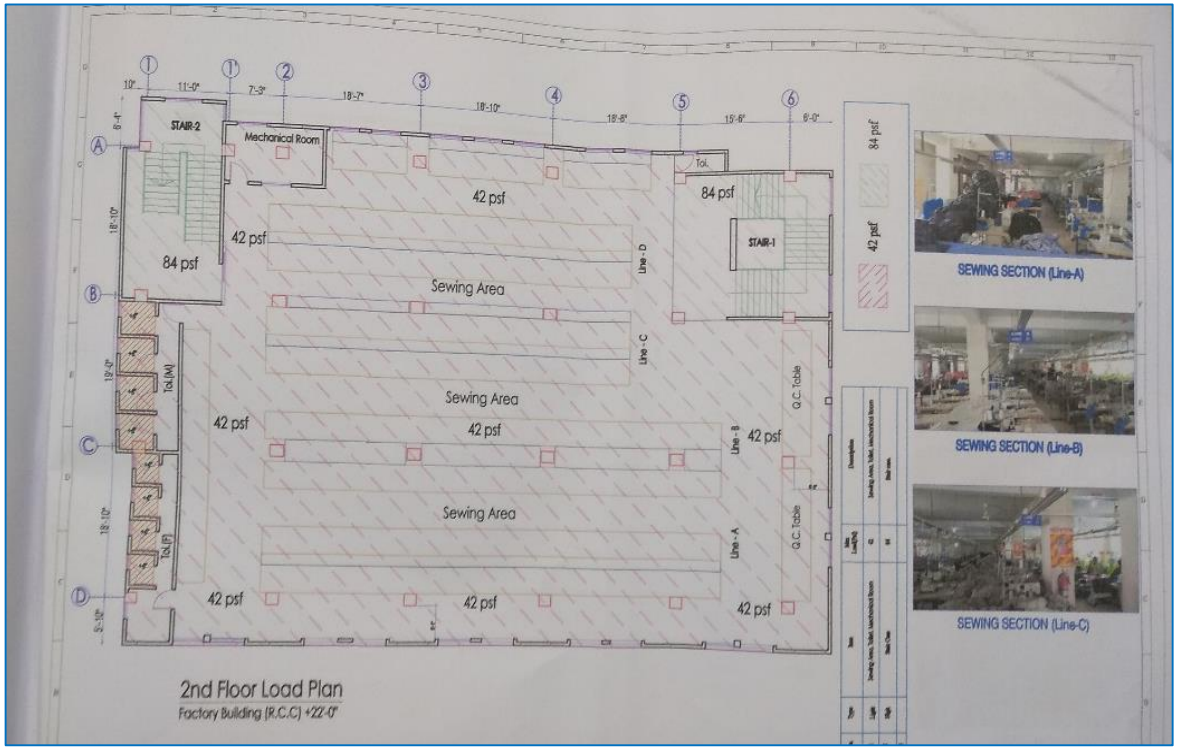
Number of toilets did not match with as-built drawings. Six nos. of female toilets were found on site where as-built drawing shows three nos.



Third Floor Layout

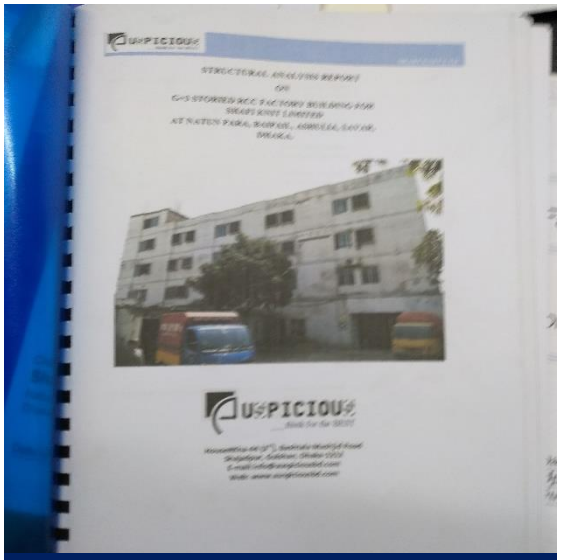
Observations: Main Building

Load plan & design reports required to be revised and submitted to Accord for further review



The provided Load Plan shows 2 kPa loading. As the second phase of construction started in July 2015 and ended in March 2016 up to roof top shed the Load Plan must be in accordance with BNBC Standard.

Factory is required to revise the DEA including Load Plan as per actual onsite condition and submit to Accord.



Design Report

Floor loading

During inspection no over loading was found. FoS calculation for internal & external columns were found satisfactory considering 3 KPa allowable floor live loading for all buildings.

Observations: Main Building

Apparent non-engineered Shed at roof without as-built documentation

Observation : Main Building

Roof Shed

Non-engineered connection

Light weight roof supported on brick wall

Apparent non-engineered shed was found at roof level. Light weight roof structure supported on 125 mm brick wall. The connections appeared to be non-engineered.
No documentation was available onsite.

Observation : Main Building

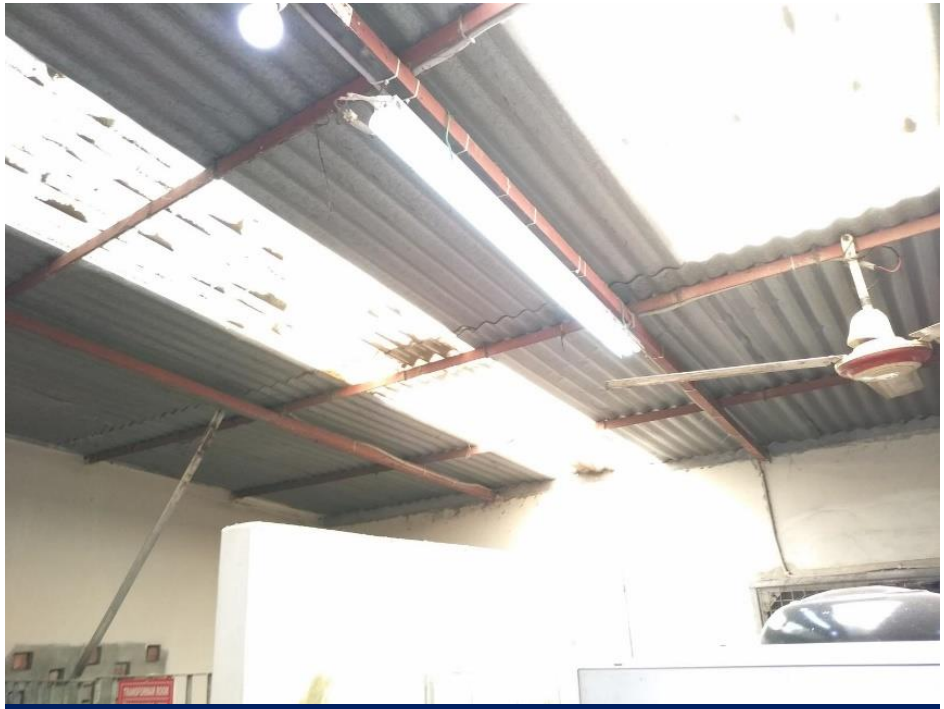
Lack of as-built documents

Observation : Shed 1 & 2

Shed-1

Shed-1

No documents were available for shed 1 & 2. Building engineer is required to prepare “as constructed” drawings that includes connection details which reflect the actual site dimensions with complete structural information.



Shed-2

Observations: Shed 1 & 2

Significant gap between steel baseplate and RCC column of Shed-1

Observations: Shed-1

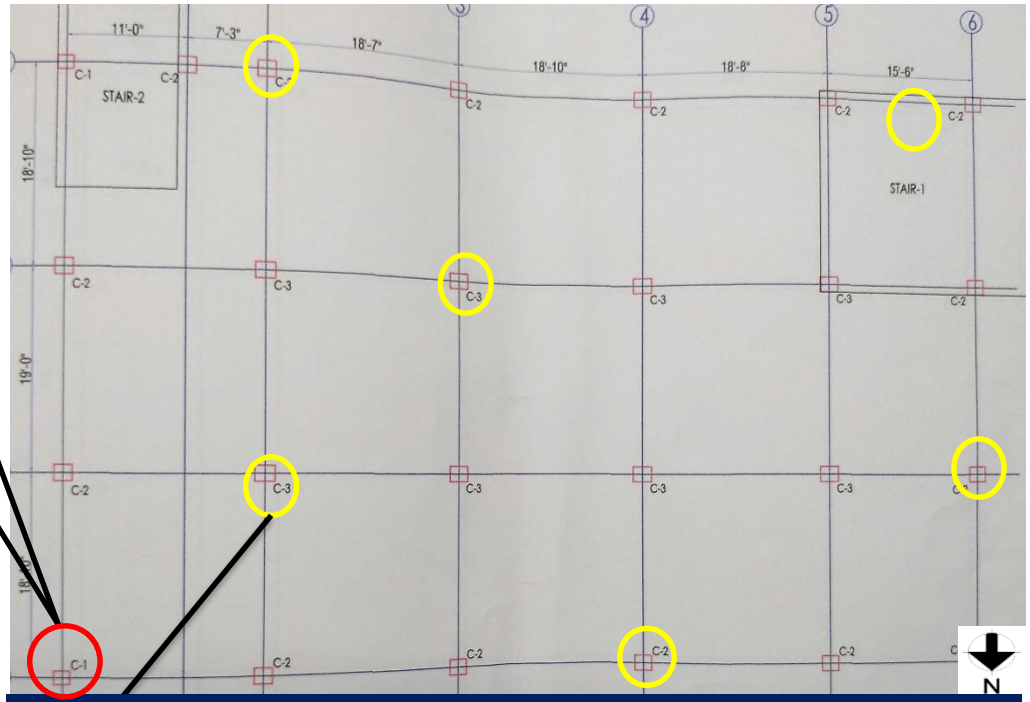
Significant gap observed between steel baseplate and RCC column.

Poor/non-engineered connection was found at extension of shed-1 (doctor's room)

Observations: Shed-1

Test Carried out

Stone Aggregate



Column layout

Rebar was checked on site by ferro scanning of different types of columns

Test Carried out: Main Building

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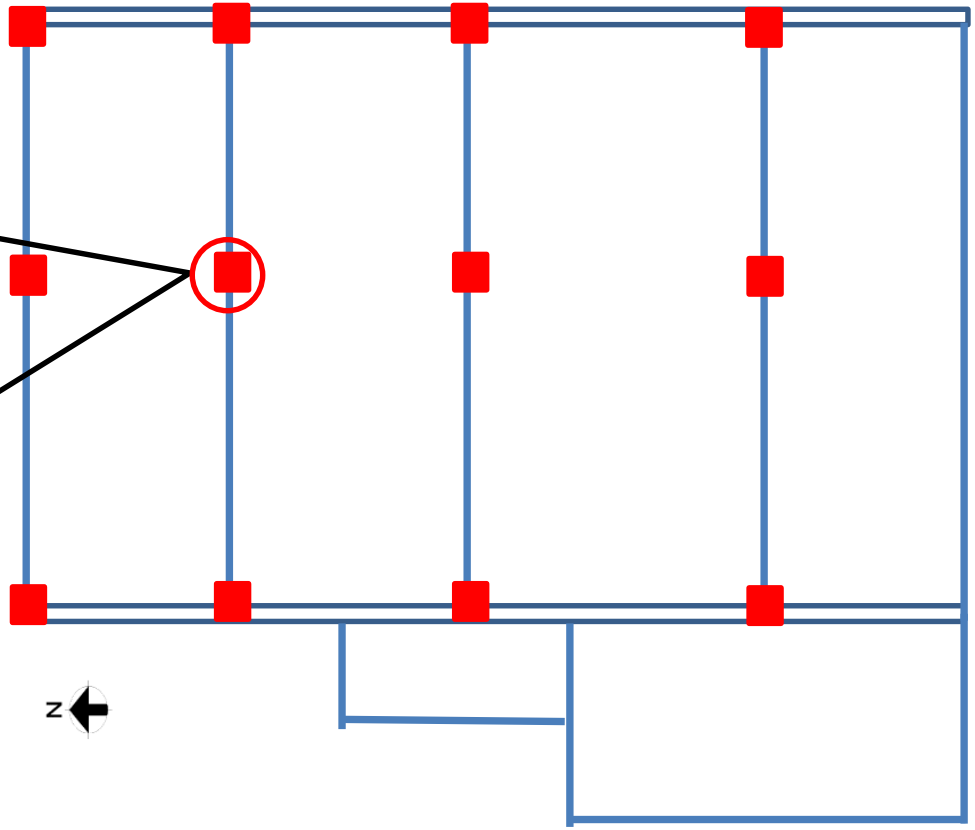
Brick Aggregate



Column layout

Test Carried out: Shed-2

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Problems Observed

Main Building:

Item-01: Discrepancies between provided drawings and on-site condition.

Item-02: Load plan & design reports required to be revised and submitted to Accord for further review.

Item-03: Apparent non-engineered Shed at roof without as-built documentation .

Shed 1& 2:

Item-04: Lack of as-built documents.

Item-05: Significant gap between steel baseplate and RCC column of Shed-1.

Priority Actions

Item 1 and actions

Discrepancies between provided drawings and on-site condition.

Priority 1 (Immediate - Now)	• Not required.
Priority 2 (within 6-weeks)	• Building Engineer to survey the structure and prepare accurate as-built drawings.
Priority 3 (within 6-months)	• Not required.

Item 2 and actions

Load plan & design reports required to be revised and submitted to Accord for further review.

Priority 1 (Immediate - Now)	• Not required.
Priority 2 (within 6-weeks)	• Design report required to be reviewed by ACCORD. • Produce and actively manage a loading plan for all floor plates within the factory, considering floor, column and foundation capacity as per BNBC provision.
Priority 3 (within 6-months)	• Complete remedial works arising from design report. • Continue to implement load plan.

Item 03 and actions

Apparent non-engineered Shed at roof without as-built documentation.

Priority 1 (Immediate - Now)	• None required.
Priority 2 (within 6-weeks)	• Prepare “as constructed” drawings which reflect the actual site dimensions with complete structural information. • Building engineer to check the capacity of the light weight roof structure against lateral loading.
Priority 3 (within 6-months)	• Carry out remedial works resulting from engineering assessment if necessary.

Item 4 and actions

Lack of as-built documents.

Priority 1

(Immediate - Now)

- None required.

Priority 2

(within 6-weeks)

- Prepare “as constructed” drawings which reflect the actual site dimensions with complete structural information.

Priority 3

(within 6-months)

- None required.

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Item 5 and actions

Significant gap between steel baseplate and RCC column of Shed-1.

Priority 1

(Immediate - Now)

- None Required

Priority 2

(within 6-weeks)

- Check the adequacy of the connections.
- Carry out suitable remedial works as per suggestion of factory engineer.

Priority 3

(within 6-months)

- None Required

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Survey Limitations and Assumptions

This report is for the private and confidential use of Accord 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 ACCORD.

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.