

Big Boss Corporation Ltd. (Extension)

Holding#30 Sharabo, Kasimpur, Gazipur
(23.985604, 90.284023)
25 September 2023



Building Information

ETP Building: This structure is a five-storied (G+4) reinforced concrete (RC) building.

Canteen Building: This structure is a two-storied (G+1) steel shed building.

Boiler Shed: This structure is a single-storied steel shed.

Chemical Store: This structure is a single-storied shed comprised of RC and Steel frame.

Substation Soom: This structure is a single-story building.

Chemical Store-2: This structure is a single-storied structure with steel shed on masonry brick wall.

Chemical Store-3: This structure is a single-storied structure with steel deck slab on RC column.

RMS Room: This structure is a single-story building. The building roof is RC slab with a partially steel shed.

Workshop & Kitchen: This structure is a single-storied RC structure.

Observations

Lack of Lateral Stability



Shear connection in floor beam in both direction



Only roof bracing and compression member

Roof bracing and compression strut on roof and shear connection in both direction of 1st floor was observed . No vertical bracing was observed under floor or wall. Hence load transfer media from roof to foundation 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.

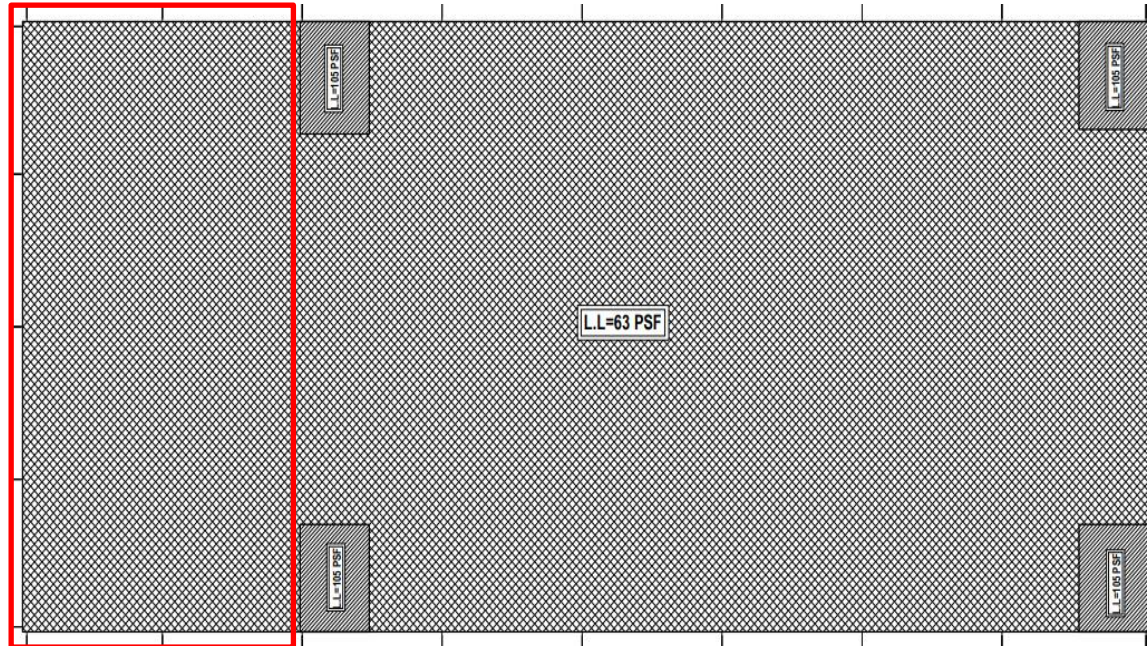
Load plan doesn't comply with BNBC

ASSEMBLY (Occupancy - E)	Library, auditorium, cinema, lecture hall, restaurant, bar, mosque, church (E1- E4)	1 Assembly room: with fixed seat without fixed seat	3.0 5.0	2.7 4.5
		2 Stages and projection room	5.0	4.5
Stadium, art gallery, grand stand, museum, gymnasium (E5)		3 Library :		
		Reading room – without book storage with book storage	2.5 4.0	4.5 4.5
		Stack room for book	6.5 ⁽³⁾	7.0
		1 With fixed seats	3.0	2.7
		2 Without fixed seats	5.0	4.5
		3 Corridor, stair and passage way	5.0	4.5

Min. 105 psf L.L . for prayer room.



Prayer room in 1st floor

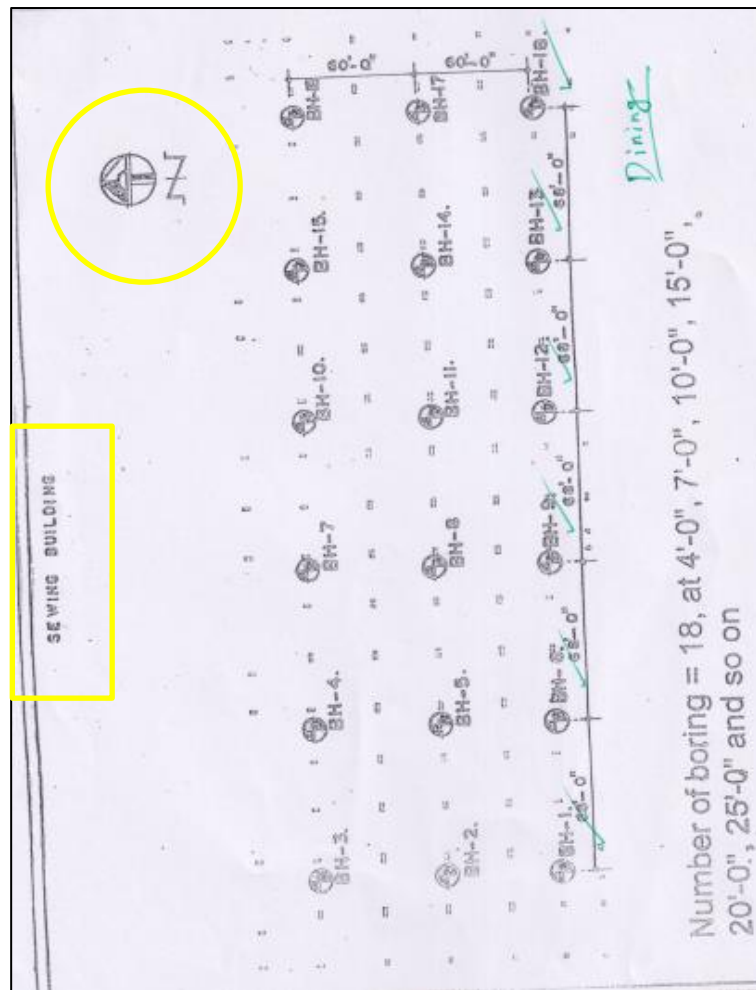


Considered live load is 63 psf for prayer room on 1st floor in load plan

The design live load considered for 1st floor is 63 psf. Building engineer is required revised load plan as per BNBC Table 6.2.3 and revise the design report as well.

7 Observations: Canteen Building

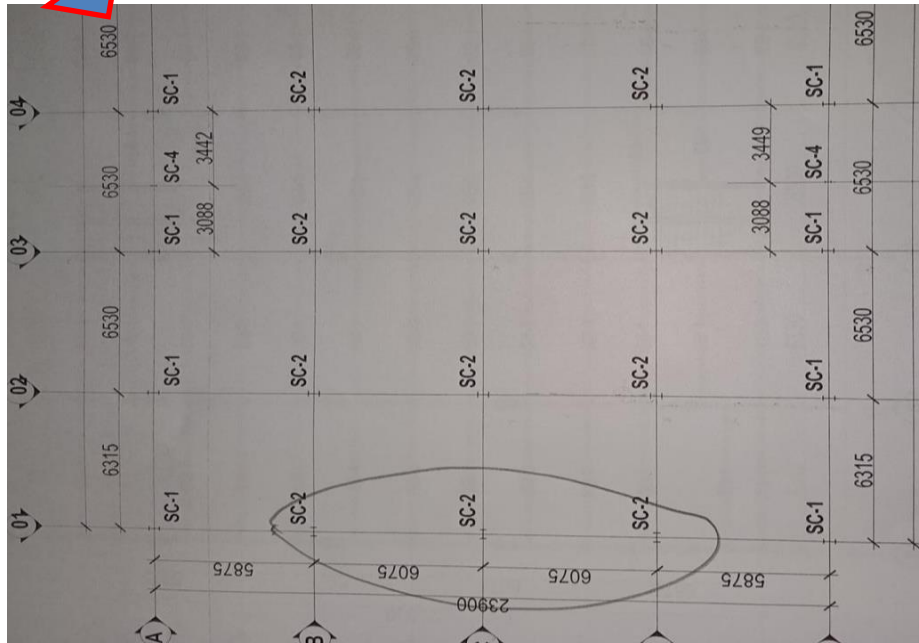
Soil-bearing capacity consideration



Bore hole location are for Sewing Building

The foundation adequacy check of this structure was done by using the data from different structures. Building engineer is required to check the foundation adequacy as per in-situ soil-bearing capacity.

Mismatch in as built drawing



Columns shown in longitudinal direction



Columns found in transverse direction

Columns orientation were not matched with as built drawing. The building engineer is required to check the column orientation and update the as-built drawing accordingly.



Column orientation below floor



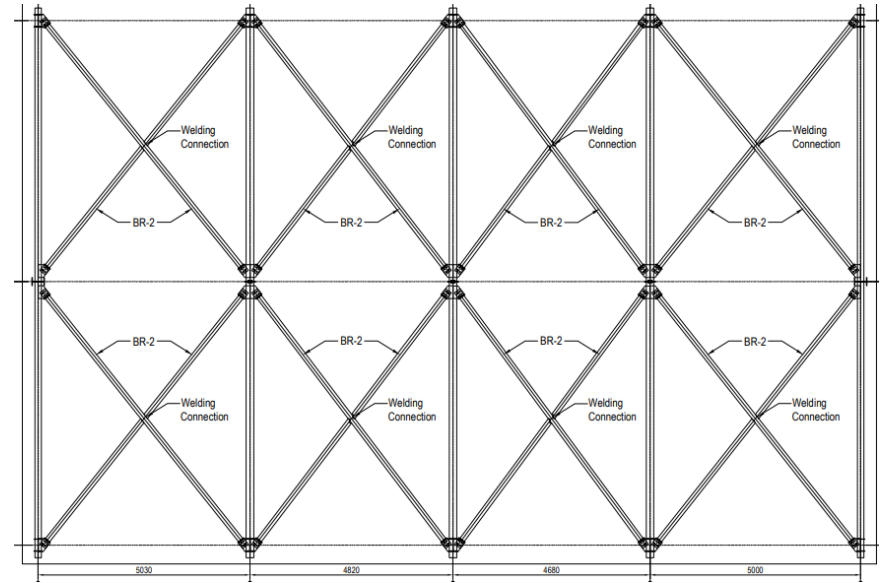
Rotated column above floor

During inspection, column above floor was observed in different orientation than column below floor. The building engineer is required to update the FEM model, check the vertical load transfer adequacy of the joint, and suggest proper remedial actions accordingly.

Lack of Lateral Stability



Compression member, wall & roof bracing missing



Roof bracing in as built drawing

No roof and wall bracing was observed as shown in the as-built drawing. Hence, the lateral stability system structure is absent. The building engineer is required to update the as-built drawing check the lateral stability of the structure as part of EA and suggest proper remedial actions accordingly.

Plate sample location need to be filled

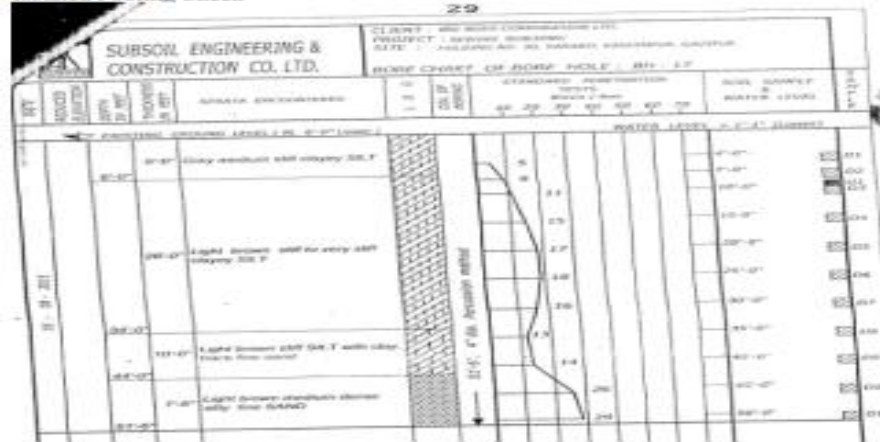


Sample has been taken from Column Flange

The factory has taken samples from steel member for plate tests. Building engineer is required to fill the sample location with adequate measures.

Design report needs to be updated

Isolated Footing Check



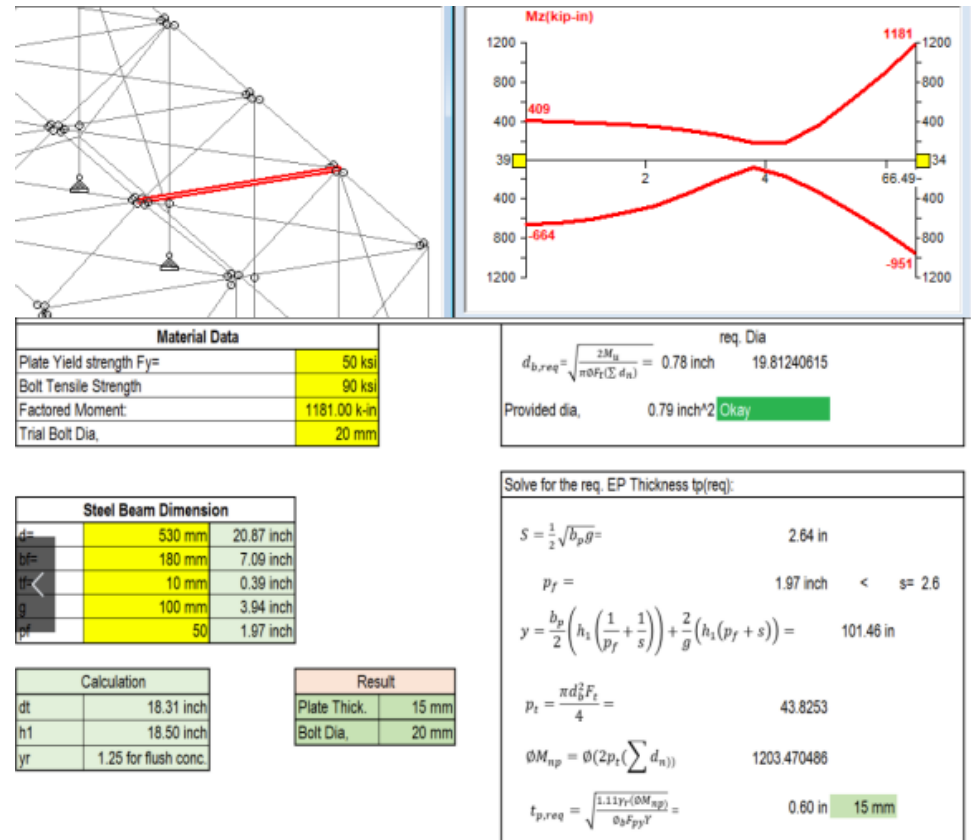
Terzaghi's Bearing capacity equation	
$q_{ult} = CN_cSc + \bar{q}N_q + 0.5B\gamma N_\gamma S_\gamma$	
C= Cohesion of soil	
B= Width of footing	
γ =Unit Weight of soil	
$\bar{q} = \gamma d$	
d= depth of foundation	
Sc, S γ = Shape factor (Sc=1.3 for Square footing)	
Nc, Nq, N γ =Bearing capacity factor from Chart	
γ =	120 lb/ft ³
ϕ =	0 for Clay soil
d=	5 feet
Nq=	1 from Chart
Nc=	5.7 from Chart
N γ =	0 for ϕ =0
(As per BNBC 2020 Appendix D)	
Unconfined Compression strength q_{uc} =12.5 N/60	
C $_{equr2}$	
N50	5
C=	31.25 Ksi/Sqmeter
or	652.5 Psi
q=	600 Psi
q $_{ult}$ =	5435 Psi
allowable=	2174 Psi (FS=2.5)
or	2.17 Ksf (With FS=2.5)

Foundation adequacy check from different soil test data

The foundation adequacy check of this structure was done by using the data from different structure. Building engineer is required to check the foundation adequacy as per in-situ soil bearing capacity.



column-rafter connection

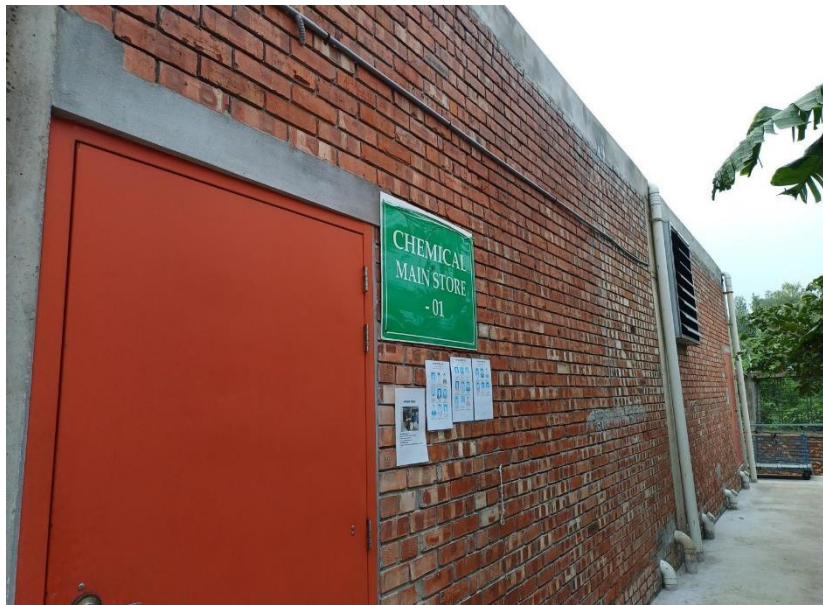


Joint design as rigid moment connection

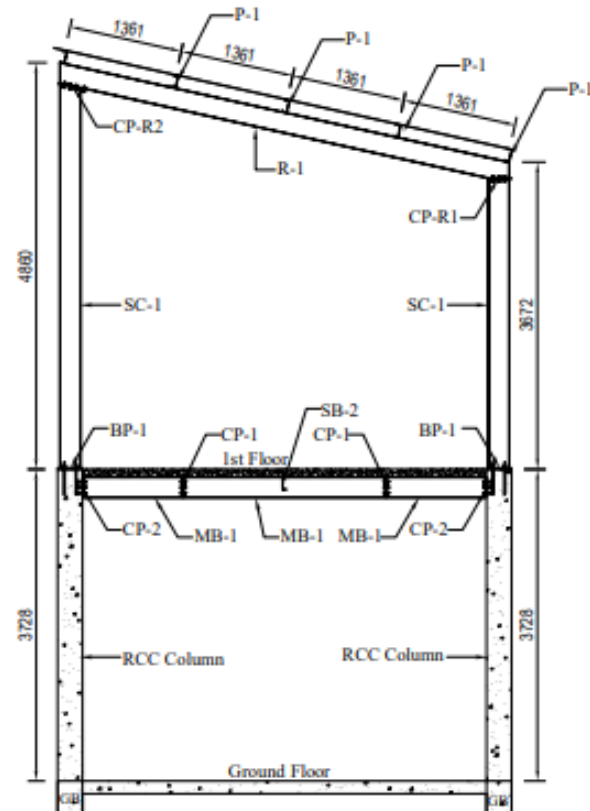
The column rafter connection design as a moment resisting connection. However, the bolt arrangement in connection is not suitable for resisting moment. Building engineer is required to check the joint adequacy as per in-situ built condition and revise the design report as well.

Observation: Boiler Shed

As built drawing need to be revised



Single storey structure



Two storied structure in as built drawing

As built drawing was found for two storied structure with a stair. During inspection single story structure was observed with no stair. Building engineer is required to survey the structures thoroughly and update the as-built drawing.

Apparently unstable cantilever slab



Cantilever slab



Member supporting cantilever slab

The cantilever slab apparently unstable as it is supported on masonry column. Building engineer is required to check the stability and deflection of the slab and update the design report as well.

Lack of test report

Table 4: Materials properties considered in the model-----ref. 6.4.1

Element	Specifications (ASTM or Equivalent)	Minimum Compressive/ Yield Strength in Mpa (ksi)
Brick Masonary (1:4)	3.75 mpa	545 psi
Grade Beam	21 mpa	2.5 ksi
RCC column	21 mpa	3 KSi
Footing	21 mpa	3 ksi

concrete strength considered in design for and beam

The structure is designed considering 3ksi concrete strength for column and fooling. However, no cylinder test or core test has been provided in this regard. The building engineer is required to do core test to verify the in-situ concrete strength.

Lack of as built drawing

**Observation: Chemical Store-2, Chemical Store-3, RMS Room,
Workshop & Kitchen**



Chemical store-2



RMS Room



Chemical store-3



Workshop and kitchen

As-built drawing was not available for these structure. Building engineer is required to produce as-built drawing for the structures.

Observation: Chemical Store-2, Chemical Store-3, RMS Room, Workshop & Kitchen

Problems Observed

Canteen Building:

Item 01: Lack of Lateral Stability.

Item 02: Load plan doesn't comply with BNBC.

Item 03: Soil-bearing capacity consideration

Item 04: Mismatch in as built drawing.

Boiler Shed:

Item 05: Lack of Lateral Stability.

Item 06: Plate sample location need to be filled.

Item 07: Design report needs to be updated

Chemical Store:

Item 08: As built drawing need to be revised.

Item 09: Apparently unstable cantilever slab.

Substation room:

Item 10: Lack of test report.

Chemical Store-2, Chemical Store-3, RMS Room, Workshop & Kitchen:

Item 11: Lack of as built drawing.

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Lack of Lateral Stability (Canteen Building) .	Building engineer is required to check the lateral stability of the structure as part of EA and suggest proper remedial actions accordingly.	6-weeks
02	Lack of Lateral Stability (Canteen Building).	Carry out remedial works if required.	6-month
03	Load plan doesn't comply with BNBC (Canteen Building).	Building engineer is required to revise the load plan as per BNBC Table 6.2.3 and revise the design report as well.	6-weeks
04	Load plan doesn't comply with BNBC (Canteen Building).	Carry out remedial works if required.	6-month
05	Soil-bearing capacity consideration (Canteen Building) .	Building engineer is required to check the foundation adequacy as per in-situ soil bearing capacity..	6-weeks
06	Soil-bearing capacity consideration (Canteen Building) .	Carry out remedial works if required.	6-month

Item No.	Observation	Recommended Action Plan	Recommended Timeline
07	Mismatch in as built drawing (Canteen Building).	The building engineer is required to check the column orientation and update the as-built drawing accordingly.	6-weeks
08	Mismatch in as built drawing (Canteen Building).	The building engineer is required to the update the FEM model, check the vertical load transfer adequacy of the joint, and suggest proper remedial actions accordingly.	6-weeks
09	Mismatch in as built drawing (Canteen Building).	Carry out remedial works if required.	6-month
10	Lack of Lateral Stability (Boiler shed).	The building engineer is required to update the as built drawing, check the lateral stability of the structure as part of EA and suggest proper remedial actions accordingly	6-weeks
11	Lack of Lateral Stability (Boiler shed).	Carry out remedial works if required.	6-month

Item No.	Observation	Recommended Action Plan	Recommended Timeline
12	Plate sample location need to be filled (Boiler shed).	Building engineer is required to fill the sample location with adequate measures.	6-weeks
13	Design report needs to be updated (Boiler shed).	Building engineer is required to check the foundation adequacy as per in-situ soil-bearing capacity.	6-weeks
14	Design report needs to be updated (Boiler shed).	Building engineer is required to check the joint adequacy as per as-built condition and revise the design report as well.	6-weeks
15	Design report needs to be updated (Boiler shed).	Carry out remedial works if required.	6-month
16	As built drawing need to be revised (Chemical Store).	Building engineer is required to survey the structures thoroughly and update the as-built drawing.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
17	Apparently unstable cantilever slab (Chemical Store).	Building engineer is required to check the stability and deflection of the slab and update the design report as well.	6-weeks
18	Apparently unstable cantilever slab (Chemical Store).	Carry out remedial works if required.	6-month
19	Lack of test report (Substation room).	Building engineer is required to do core test for in-situ concrete strength.	6-weeks
20	Lack of as built drawing (Chemical Store-2, Chemical Store-3, RMS Room, Workshop & Kitchen)	Building is required to produce as-built drawing for the structures	6-weeks

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.