

Shrabony Knitwear Ltd.

Kathgora, Zirabo, Ashulia, Savar, Dhaka, Bangladesh.

(23.916646N,90.298140E)

17th November, 2016

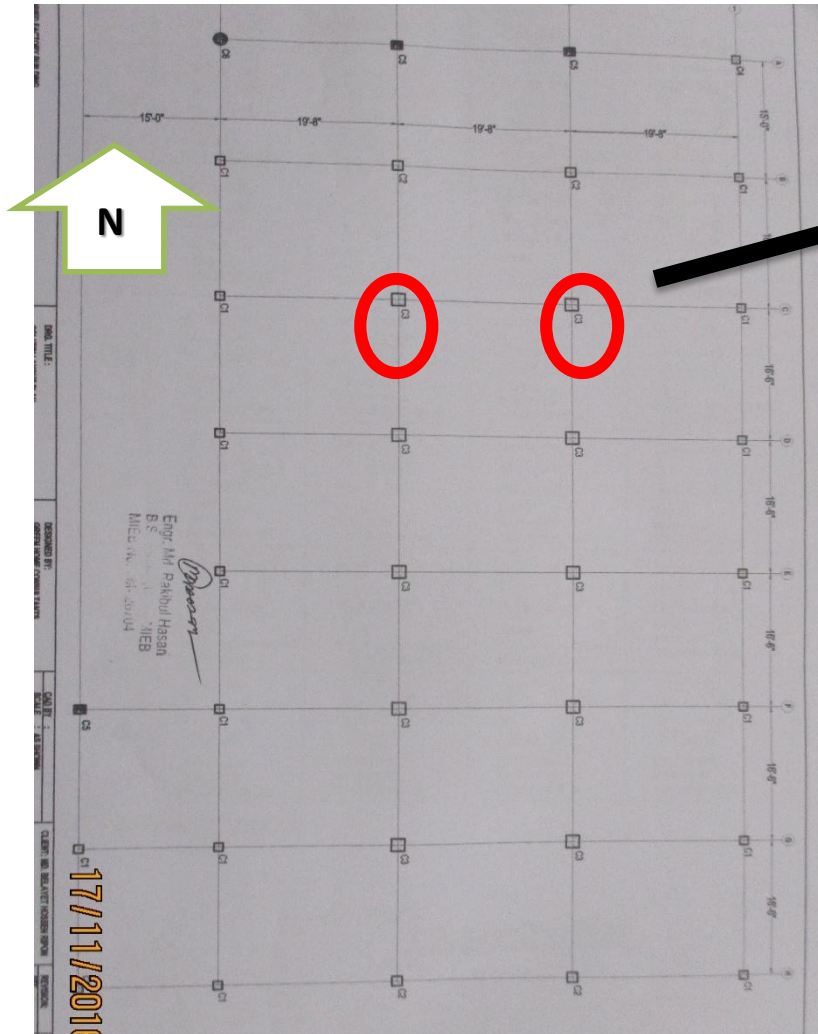




Observations



High stress levels in columns (Main Production Building)



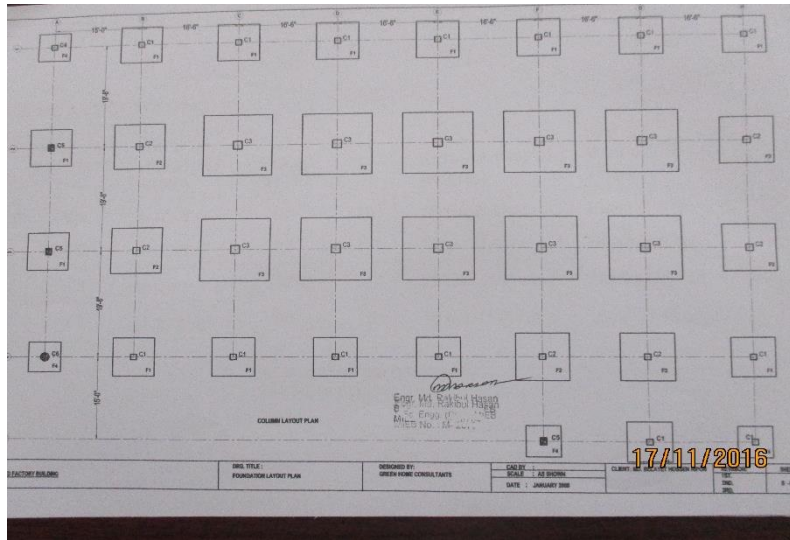
Cursory calculations indicate that the working stress in these internal columns are in excess of normal design limits.

Factory Engineer to perform a Detail Engineering Assessment (see attached scope) and concrete tests to prove adequacy of column sizes

High stress levels in columns (Main Production Building)



As- Built Drawings not available



	Up to GB	Upto 2nd slab	3th slab	4th slab
C1	15x15" 8-20 mm ϕ 10mm ϕ @675" c/c	12x12" 4-20 mm ϕ +4-16mm ϕ 10mm ϕ @675" c/c	12x12" 4-20 mm ϕ +4-16mm ϕ 10mm ϕ @675" c/c	12x12" 6-16 mm ϕ 10mm ϕ @675" c/c
C2	17x17" 8-20 mm ϕ 10mm ϕ @675" c/c	14x14" 8-20 mm ϕ 10mm ϕ @675" c/c	14x14" 4-20 mm ϕ +4-16mm ϕ 10mm ϕ @675" c/c	14x14" 8-18mm ϕ 10mm ϕ @675" c/c
C3	15x15" 8-20 mm ϕ 10mm ϕ @675" c/c	15x15" 8-20 mm ϕ 10mm ϕ @675" c/c	15x15" 8-20 mm ϕ 10mm ϕ @675" c/c	15x15" 4-20 mm ϕ +4-16 mm ϕ 10mm ϕ @675" c/c
C4	15x15" 8-16 mm ϕ 10mm ϕ @675" c/c	12x12" 8-16 mm ϕ 10mm ϕ @675" c/c	12x12" 8-16 mm ϕ 10mm ϕ @675" c/c	12x12" 8-16 mm ϕ 10mm ϕ @675" c/c
C5	15x15" 4-20 mm ϕ +4-16mm ϕ 10mm ϕ @675" c/c	12x12" 4-20 mm ϕ +4-16mm ϕ 10mm ϕ @675" c/c	12x12" 4-20 mm ϕ +4-16mm ϕ 10mm ϕ @675" c/c	12x12" 8-16 mm ϕ 10mm ϕ @675" c/c
C6	16" ϕ SPIRAL 10-16 mm ϕ 10mm ϕ @475" c/c	16" ϕ SPIRAL 10-16 mm ϕ 10mm ϕ @475" c/c	16" ϕ SPIRAL 10-16 mm ϕ 10mm ϕ @475" c/c	16" ϕ SPIRAL 8-18 mm ϕ 10mm ϕ @475" c/c

Structural drawings were available for Main production building only, but architectural drawings were not available

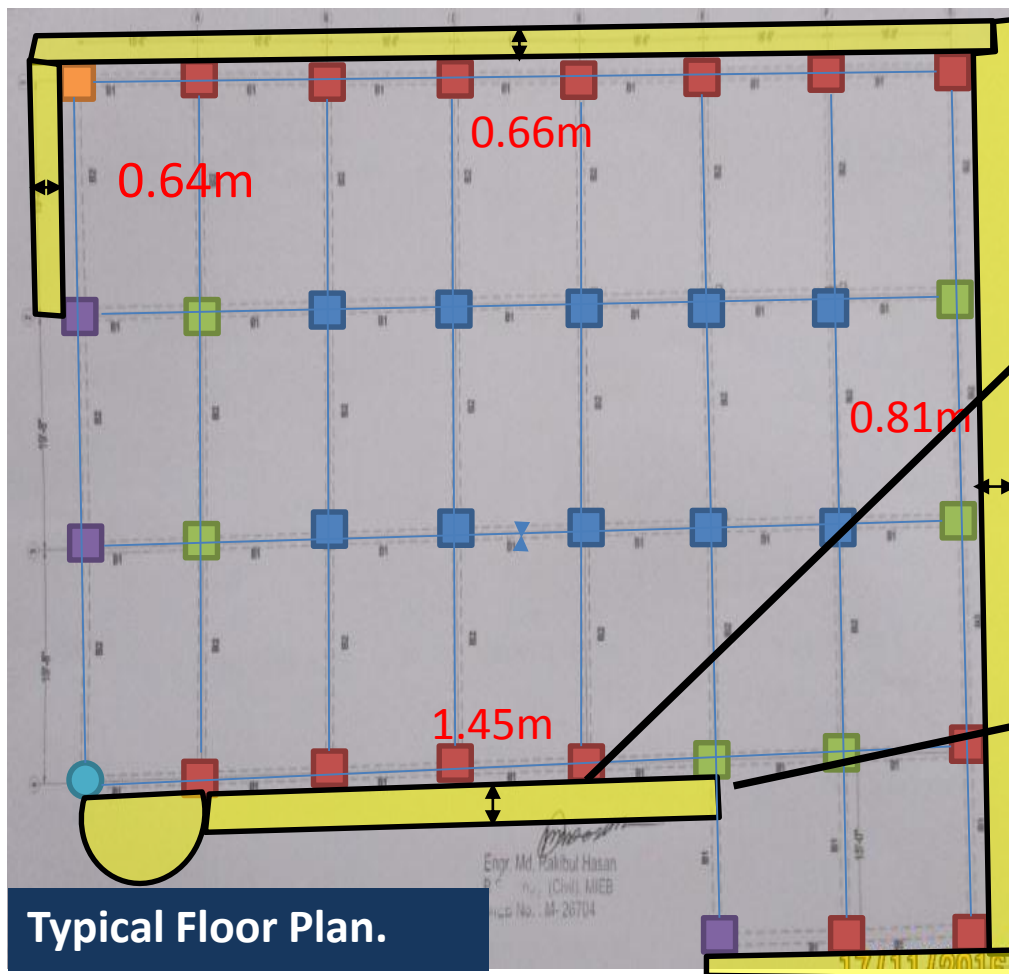


No detail drawings (As built structural) were found for other structures during inspection.

As- Built Drawings not available



Cracks on masonry wall of cantilevered portion at first floor



Typical Floor Plan.



Cantilever portion

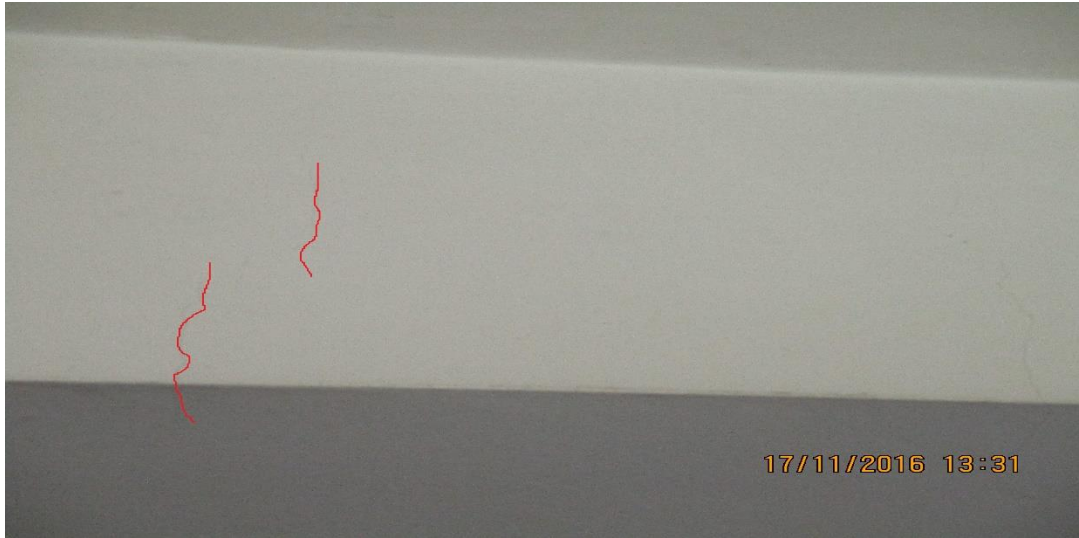
Cantilever portions were observed in Main Production Building

Cracks were observed during inspection at 1st floor of front cantilever portion.

Cracks on masonry wall of cantilevered portion at first floor



Hairline cracking on beams at Main production building



Hairline cracks
found in beams at
1st and 2nd floor.
The cause of
cracking must be
checked by
engineer

Hairline cracking on beams at Main production building



Apparently Non-Engineered roof of extended portion & Production shed



Non engineered connection (Fabric Storage, Production Shed)



Non engineered connection (Finishing and Cutting Section, Production Shed)



Non engineered connection (Fabric Storage, Production Shed)

Non engineered connections were observed. Besides no structural drawings were available



Non engineered roof (Extended portion)

Apparently Non-Engineered roof of extended portion & Production shed



No Proper Expansion Joint Between Main Production Building and Extended Portion



Main Production building and Extended portion were constructed without establishing proper Expansion joint. Factory management also confirmed this information that slab of these two buildings are connected. Although, no severe cracks were visible, but Factory engineer to look into this matter to clarify the load transfer path in case of lateral loading .

No Proper Expansion Joint Established Between Main Production Building and Extended Portion



Ongoing Demolition work



We observed demolition of an RC water tank was going on at the roof top of Main production building. However, no safety measures were taken

Ongoing Demolition work



Problems Observed

Item 1: High stress levels in columns (Main Production Building)

Item 2: Cracks on masonry wall of cantilevered portion at first floor

Item 3: As- Built Drawings not available

Item 4: Hairline cracking on beams at Main production building

Item 5: Apparently Non-Engineered roof of extended portion & Production shed

Item 6: No Proper Construction Joint Established Between Main Production Building and Extended Portion

Item 7: Ongoing Demolition work

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	High stress levels in columns (Main Production Building)	Building Engineer to review design, loads and column stresses in all columns for Main Production Building.	Immediate - Now
2	High stress levels in columns (Main Production Building)	Verify in-situ concrete stresses by 100mm dia. cores from 4 min. columns in the building.	Immediate - Now
3	High stress levels in columns (Main Production Building)	A Detail Engineering Assessment of Main Production Building to be commenced (see attached Scope).	Immediate - Now
4	High stress levels in columns (Main Production Building)	Detail Engineering Assessment to be completed	6-weeks
5	High stress levels in columns (Main Production Building)	Produce and actively manage a loading plan for all floor plates within the Building	6-weeks
6	High stress levels in columns (Main Production Building)	Actions identified in the Detail Engineering Assessment to be implemented.	6-months
7	High stress levels in columns (Main Production Building)	Continue to implement the load management plan.	6-months



Detail Engineering Assessment

This Schedule develops a minimum level of information, Analysis and testing expected as part of a Detail Engineering Assessment.

The Building(s) have been visually assessed and it is deemed necessary that a detailed engineering assessment be carried out by a competent Engineering Team employed by the factory Owner.

This Request should be read in conjunction with the BUET developed Tripartite Guideline document for Assessment of Structural Integrity of Existing RMG Factory Buildings in Bangladesh (Tripartite Document), the latest version of this document should be referenced. This document also gives guidance on required competency of Engineering Team.

We expect that the following will be carried out:

1. Development of Full Engineering As-Built Drawings showing Structure, loading, elements, dimensions, levels, foundations and framing on Plan, Section and Elevational drawings.
2. The Engineering team are to carry out supporting calculations with a model based design check to assess the safety and serviceability of the building against loading as set out in BNBC-2006, Lower rate provisions can be applied in accordance with the Tripartite Guidelines following international engineering practice, justification for these lower rate provisions must be made.
3. A geotechnical Report describing ground conditions and commenting on foundation systems used/proposed.
4. A report on Engineering tests carried out to justify material strengths and reinforcement content in all key elements studied.
5. Detailed load plans shall be prepared for each level showing current and potential future loading with all key equipment items shown with associated loads.
6. The Engineering team will prepare an assessment report that covers the following:
 - As-Built drawings including
 - Plans at each level calling up and dimensioning all structural components
 - Cross sectional drawings showing structural beams, slabs, floor to floor heights, roof build-ups and Basic design information of the structure
 - Highlight any variation between As-built compared to the designed structure
 - Results of testing for strength and materials
 - Results of geotechnical assessment and testing/investigation
 - Details of loading, inputs and results of computer modelling
 - Commentary on adequacy/inadequacy of elements of the structure
 - Schedule of any required retrofitting required for safety or performance of Structure



Item No.	Observation	Recommended Action Plan	Recommended Timeline
8	Cracks on masonry wall of cantilevered portion at first floor	Building Engineer to verify reasons behind cracking and check if the deflection is within the limit.	6-weeks
9	Cracks on masonry wall of cantilevered portion at first floor	Propose any remedial measures required.	6-weeks
10	Cracks on masonry wall of cantilevered portion at first floor	Produce and actively manage a loading plan for all cantilever portions within the Building.	6-weeks
11	Cracks on masonry wall of cantilevered portion at first floor	Implement any remedial measures suggested by the engineer.	6-months
12	Cracks on masonry wall of cantilevered portion at first floor	Continue to implement the load management plan	6-months
13	As- Built Drawings not available	Comprehensive As-Built drawings are to be produced for all buildings.	6-weeks
14	Hairline cracking on beams at Main production building	Sections of plaster finish to beams and slab to be removed to investigate if cracks penetrate the building structure.	6-weeks
15	Hairline cracking on beams at Main production building	As part of the Detail Engineering Assessment (see Item 1), Building Engineer to carry out design check on beams and slabs	6-weeks
16	Hairline cracking on beams at Main production building	Carry out any structural remedial works to cracks as required following assessment.	6-months



Item No.	Observation	Recommended Action Plan	Recommended Timeline
17	Apparently Non-Engineered roof of extended portion & Production shed	A Detail Engineering Assessment of Production Shed (all portions) and Extended portion to be commenced (see attached Scope).	Immediate - Now
18	Apparently Non-Engineered roof of extended portion & Production shed	Foundation details should be covered as part of DEA.	6-weeks
19	Apparently Non-Engineered roof of extended portion & Production shed	Lateral Stability for all non –engineered shed/connections to be checked as part of DEA.	6-weeks
20	Apparently Non-Engineered roof of extended portion & Production shed	Detail Engineering Assessment to be completed	6-weeks
21	Apparently Non-Engineered roof of extended portion & Production shed	Produce and actively manage a loading plan for all floor plates of Extended portion.	6-weeks
22	Apparently Non-Engineered roof of extended portion & Production shed	Implement any remedial measures suggested by the engineer.	6-months
23	Apparently Non-Engineered roof of extended portion & Production shed	Continue to implement the load management plan at Extended portion	6-months



Item No.	Observation	Recommended Action Plan	Recommended Timeline
24	No Proper Construction Joint Established Between Main Production Building and Extended Portion	Factory engineer to clarify the load transfer path in case of lateral loading and check adequacy of the connecting slab .	6-weeks
25	No Proper Construction Joint Established Between Main Production Building and Extended Portion	Propose remedial measures if required.	6-weeks
25	No Proper Construction Joint Established Between Main Production Building and Extended Portion	Carry out remedial works which will be the outcome of the assesment	6-months
25	Ongoing Demolition work	Carry out all demolition works taking all necessary safety measures (Like safety net etc.)	Immediate - Now
25	Ongoing Demolition work	Finish demolition of RC water tank.	6-weeks