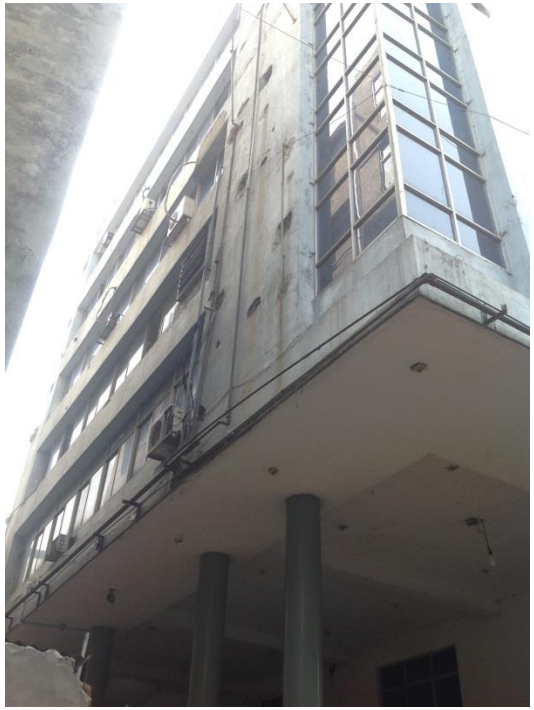
Beq Knit Ltd/Beq Sweater Ltd/Tammam Design Ltd

Zirabo, Pukorpar, Asulia, Dhaka

(+23.91227N, 90.30858E)

01 April 2014



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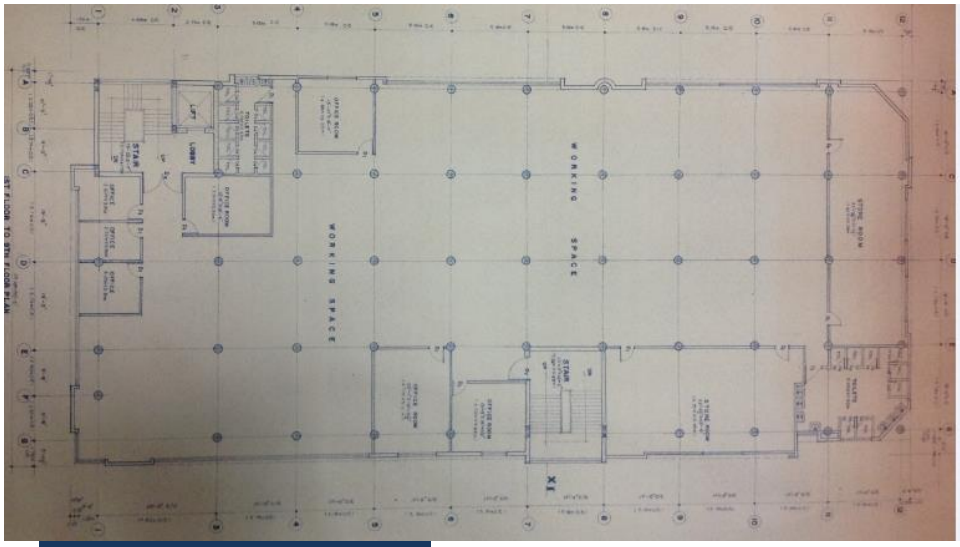
Building Observations

Columns in Building 1 appear to be stressed in excess of normal design limits



Typical column layout

Tested Ground Floor Column – Brick Chips

Outline calculations indicate column working stress is in excess of normal design limits in Building 1.

Immediately reduce all Live Load in building 1 to 1.5kPa

A Detail Engineering Assessment of the building is required (see attached Scope). Engineer is to perform detailed calculations based on as-constructed dimensions and concrete & reinforcement tests to prove column adequacy

Column Strength – Building 1

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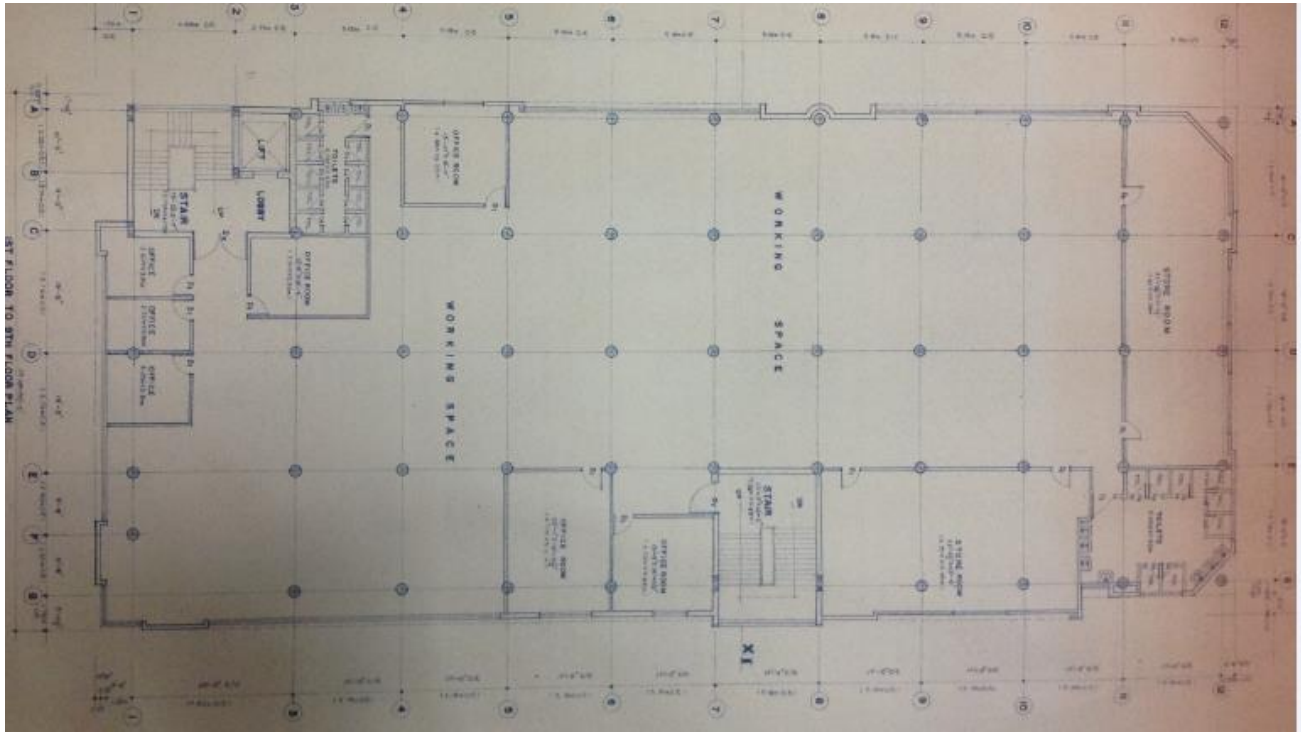
Lateral Stability of Building 1



Lateral stability of Building 1 to be reviewed for following reasons:

- **Slender columns with flat slab**
- **Façade brickwork does not line up with edge columns in most areas due to cantilevers, so little stability from infill brick walls**

Lateral stability check to be included in Detail Engineering Assessment.

Stability of Building 1

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Stability of steel roof to dining area to be reviewed by Building Engineer

Building Engineer to confirm support/connection detail at these locations.

Roof structure to Dining Area - may be susceptible to wind uplift and instability. Building Engineer to review.

Steel Roof to Dining Area
Building 1

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Cantilever beam connection to façade. Building Engineer to confirm support/connection detail at these locations.

Steel Roof to Dining Area
Building 1

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Large Cantilevers

Cracking to be monitored/reviewed by engineer.

Cantilevered slabs in 2 directions with large line loads on edges as well as large storage loads in areas over. Building Engineer to review.

Cantilevers – Building 1

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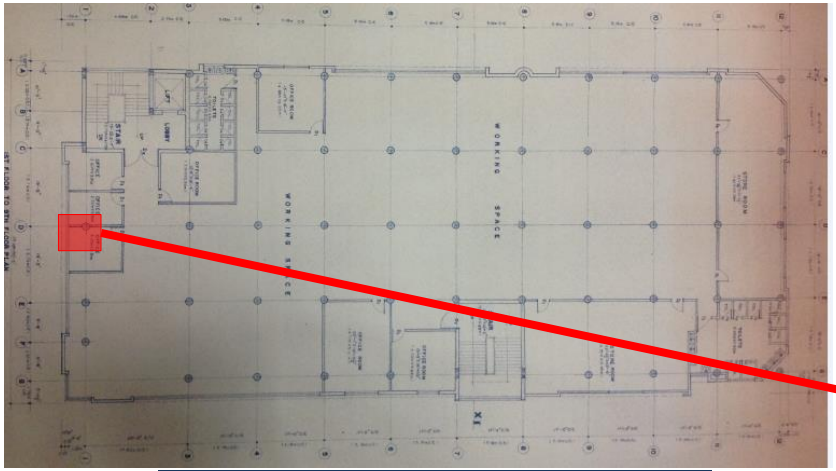
Eccentric beam/column connection



4th Floor Layout Plan

Slab Cantilevers from beam -
Beam to Column connection is eccentric.
Building engineer to review.

Eccentric beam/column connection
Building 1

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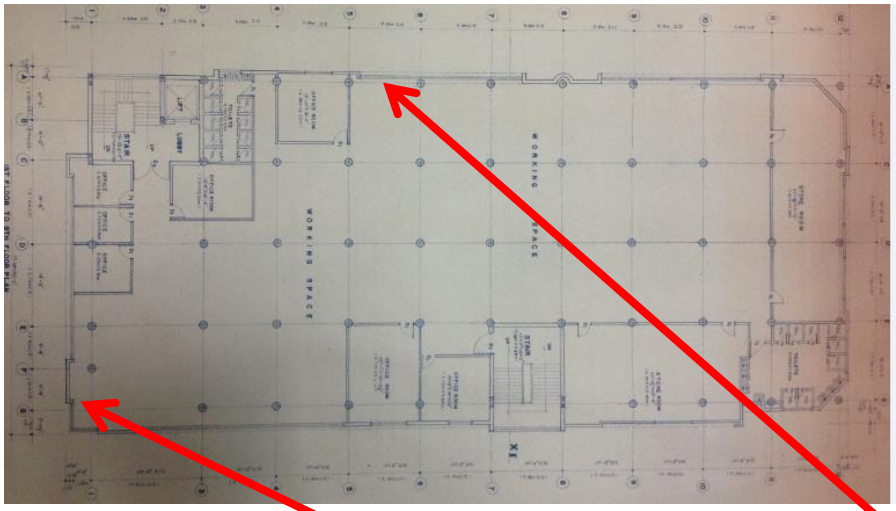
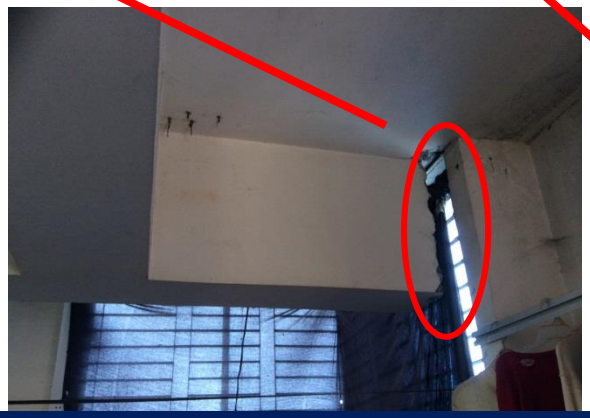
Exposed reinforcement



Exposed reinforcement at soffit to beam supporting roof slab in Building 2.

Reinforcement to be protected and concrete to be repaired at these locations.



Exposed reinforcement at end of cantilever beam supporting 7th Floor (Roof) slab

Exposed reinforcement at soffit to 1st floor slab.

Exposed reinforcement

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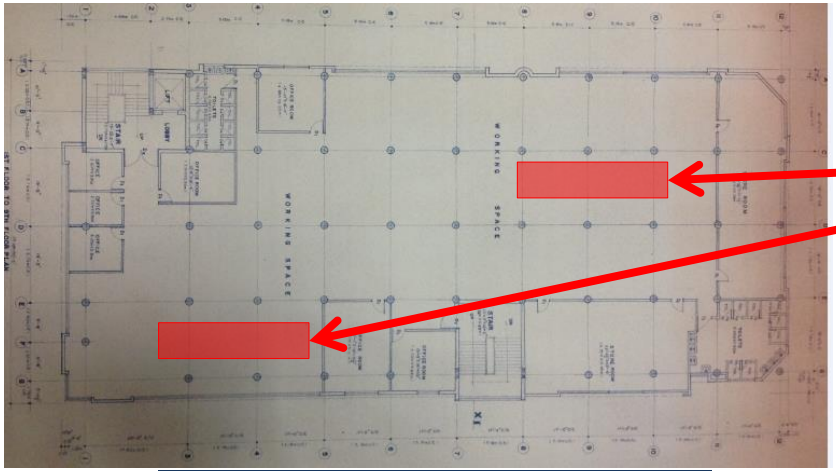
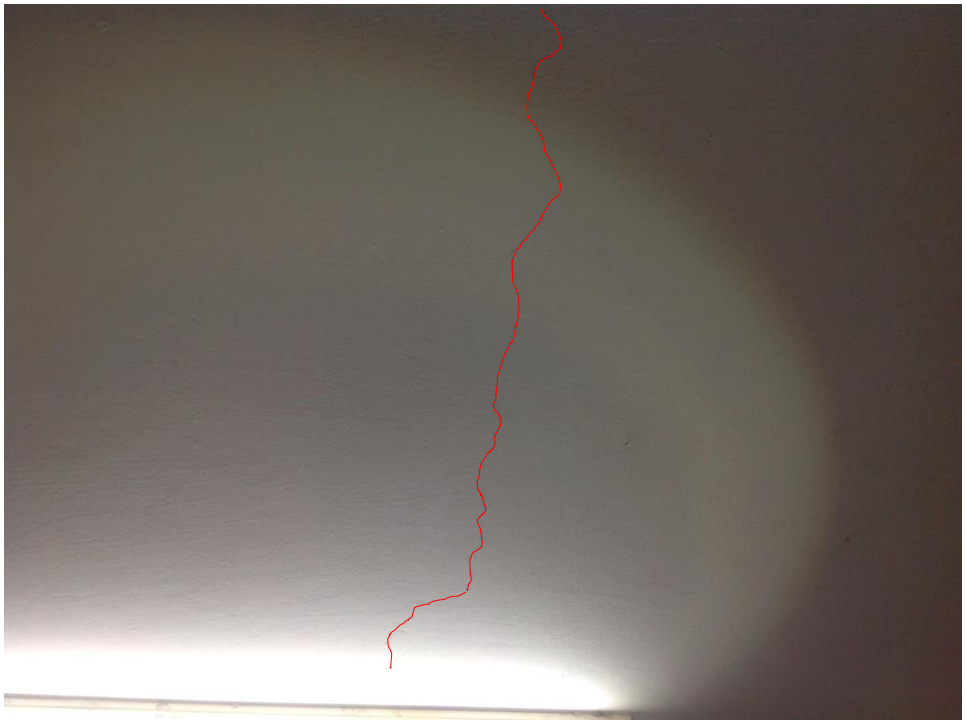
Cracking in slab soffits



Soffit plan of 6th floor slab

Cracks noted in these locations



Beam cracks at soffit of 6th floor slab to be reviewed by removing plaster to assess whether cracks extend into structure.

Cracking in slab soffits

Building 1 columns at ground floor level are susceptible to impact loading from vehicles

Building 1 column at ground floor level susceptible to impact loading from vehicles. Existing protection to be reviewed for robustness

Vehicle impact loading

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Proximity of Lake/Surface water channel.

Lake is very close to structure, though Management say the building has never flooded. Building engineer to monitor building for signs of water ingress and appropriate action to be taken if ingress occurs.

Proximity of Lake/Surface water channel.

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Uncontrolled stacking of material

Uncontrolled stacking of material

Building Engineer to prepare controlled loading plans for all floors which will designate where storage can be placed.

Overloading

Lateral Stability of Dye Process Building

Bracing was found to be comprised of rope which was loose. No bracing in some areas. Building engineer to review stability of entire structure.

Stability of Dye Process Building

Corrosion of steel members in Dye Process Building

Building Engineer to review cause of corrosion to steel columns. Causes should be mitigated and affected steel should be repaired.

Dye Process Building - Corrosion

Priority Actions

Problems Observed

Buildings 1 and 2

1. Columns in Building 1 appear to be stressed in excess of normal design limits
2. Lateral stability of Building 1
3. Large spans on cantilevers in Building 1
4. Columns susceptible to impact loading
5. Stability of steel roof to Dining Area – Building 1
6. Eccentric beam/column connections – Building 1
7. Uncontrolled Stacking in Buildings 1 and 2
8. Damage to concrete and exposed reinforcement
9. Hairline cracking to slab soffits
10. Proximity of water bodies

Dye Process Building

11. Stability of the steel structure
12. Corrosion of the steel columns

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Verify concrete strength and reinforcement type/size in Building 1 columns	Limit the Live Load on all floors in Building 1 to 1.5kPa.	**Immediate - Now**
2	Verify concrete strength and reinforcement type/size in Building 1 columns	Verify insitu concrete strength either by 100mm diameter cores or existing cylinder strength data for cores from min. 4 columns.	**Immediate - Now**
3	Verify concrete strength and reinforcement type/size in Building 1 columns	Verify reinforcement type and diameter in min. 4 no. ground floor columns.	**Immediate - Now**
4	Verify concrete strength and reinforcement type/size in Building 1 columns	A Detail Engineering Assessment of Building 1 to be commenced, see attached Scope.	**Immediate - Now**
5	Verify concrete strength and reinforcement type/size in Building 1 columns	Produce and actively manage a loading plan for all floor plates within Building 1, giving consideration to floor capacity and column capacity.	**6-weeks**
6	Verify concrete strength and reinforcement type/size in Building 1 columns	Detail Engineering Assessment to be completed.	**6-weeks**
7	Verify concrete strength and reinforcement type/size in Building 1 columns	Continue to implement load plan	**6-months**
8	Lateral stability of Building 1	As part of Detail Engineering Assessment (see Item 1), the lateral stability of Building 1 should be assessed.	**6-weeks**

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. T his 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

Any proposals for Retrofitting to follow guidance developed in the Tripartite Document

Item No.	Observation	Recommended Action Plan	Recommended Timeline
8	Lateral stability of Building 1	As part of Detail Engineering Assessment (see Item 1), the lateral stability of Building 1 should be assessed.	**6-weeks**
9	Large spans on cantilevers – Building 1	As part of Detail Engineering Assessment (see Item 1), cantilever design to be reviewed by engineer. All loading including façade loads to be checked.	**6-weeks**
10	Large spans on cantilevers – Building 1	Implement any actions arising from review of cantilever design.	**6-months**
11	Building 1 columns at ground floor level are susceptible to impact loading from vehicles	Building Engineer to devise and implement details of protection to columns from vehicle impact	**6-weeks**
12	Stability of steel roof to Dining Area (Building 1) to be reviewed by Building Engineer to confirm that it is braced and adequately designed to resist high wind loading	The steel roof over the Dining Area should be reviewed by the Building Engineer and, if required, upgraded to support code vertical and wind loads – alternatively, the area should be vacated and removed	**6-weeks**
13	Eccentric beam/column connections – Building 1	As part of Detail Engineering Assessment (see Item 1), Building Engineer to review calculations of cantilevered structures, with eccentricity of beam and column connections included.	**6-weeks**
14	Eccentric beam/column connections – Building 1	Implement any actions arising from review.	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
15	Management of storage loads in Buildings 1 and 2	Produce and actively manage a loading plan for all floor plates in Building 2, giving consideration to floor capacity and column capacity.	**6-weeks**
16	Management of storage loads in Buildings 1 and 2	(See Item 1 for Building 1 actions)	**6-weeks**
17	Management of storage loads in Buildings 1 and 2	Continue to implement load management plan	**6-months**
18	Damage to concrete and exposed reinforcement	Building Engineer to oversee cleaning of all exposed reinforcement and devise details of structural repairs	**6-weeks**
19	Damage to concrete and exposed reinforcement	Complete structural repair of all damaged concrete.	**6-months**
20	Hairline cracking to slab soffits	Building Engineer to oversee removal of a section of plaster to soffit of slabs to access if crack is apparent in structural elements	**6-weeks**
21	Hairline cracking to slab soffits	Carry out structural repairs as necessary to slab structure	**6-weeks**
22	Hairline cracking to slab soffits	Structural elements to be monitored for cracking on an ongoing basis	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
23	Proximity of Water Bodies	Building Engineer to monitor the structure for signs of water ingress and take preventative action if necessary.	**6-months**
24	Stability of steel structure of Dye Process building	The steel structure of the Dye Process building should be reviewed by the Building Engineer and, if required, upgraded to support code vertical and wind loads – alternatively, the area should be vacated and removed	**6-weeks**
25	Corrosion of steelwork in Dye Process building	Building Engineer to oversee cleaning of all corrosion from steelwork and the application of appropriate primer paint to all cleaned steelwork	**6-weeks**
26	Corrosion of steelwork in Dye Process building	Continue to monitor for corrosion and remediate as necessary	**6-months**