Chittagong Fashion Specialized Textiles Ltd

Plot No 26, Sector 1, Road 4, CEPZ, Chittagong
(+22.29119N, 91.77497E)

11 February 2014

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Building Observations

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Columns appear to be stressed in excess of normal design limits

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East Block

West Block

Cursory calculations indicate that column size appears to be smaller than required by code for the applied dead and live load, assuming typical concrete strength

Building Engineer to perform detailed calculations and concrete tests to prove column size and (if required) :

- **Reduce loads by preparation of allowable floor loading plans**
- **Carry out strengthening works**

Columns appear to be stressed in excess of normal design limits

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Structural drawings provided were incomplete and do not fully represent the as-constructed building structure

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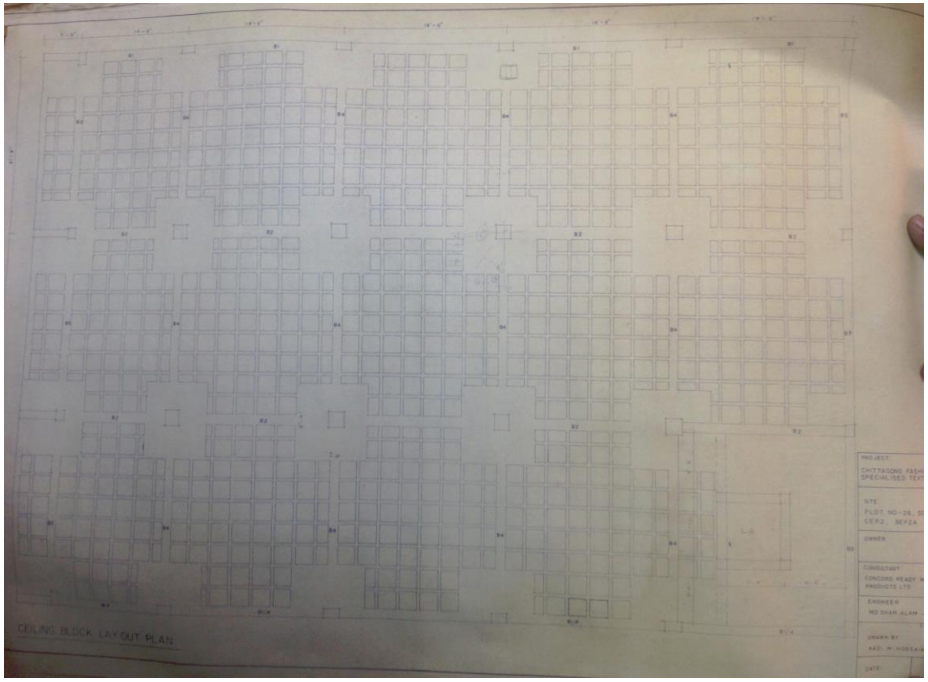

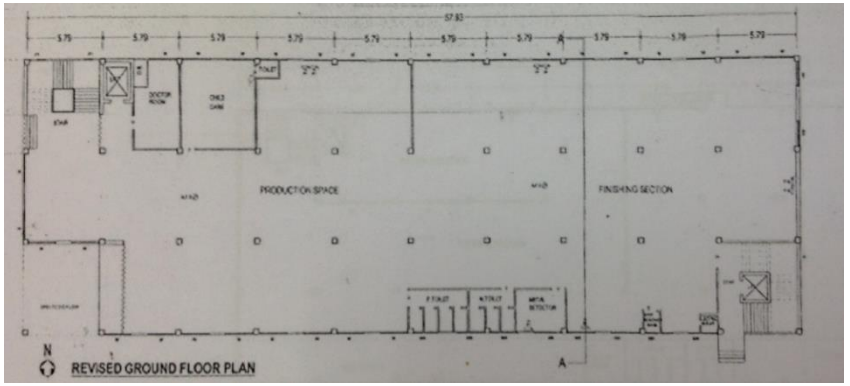

Structural drawings show a single structural system rather than the as- built structure which is effectively two separate but interconnected buildings with different structural systems.
Column grid dimensions in the East – West direction do not correspond between the permit drawings and the as- built structure.

Incomplete & Out of Date Drawings

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Visible sagging in mezzanine floor beams above Dining Area– East Block

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Visible sagging in support beams for mezzanine above the Dining Area. This mezzanine floor is used as a storage zone.

Building Engineer to review and prepare calculations to verify the structural adequacy of the mezzanine floor and supports.

Mezzanine Storage Floor.

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Lightweight steel roof to the East Block does not appear to be adequately braced to resist high wind loading

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Roof stability appears reliant on stiffness of supporting columns, purlins and light deck roof – Building Engineer to review.

Lateral stability of Roof above Dining Area Mezzanine.

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Cracking to underside of floor slab throughout East Block

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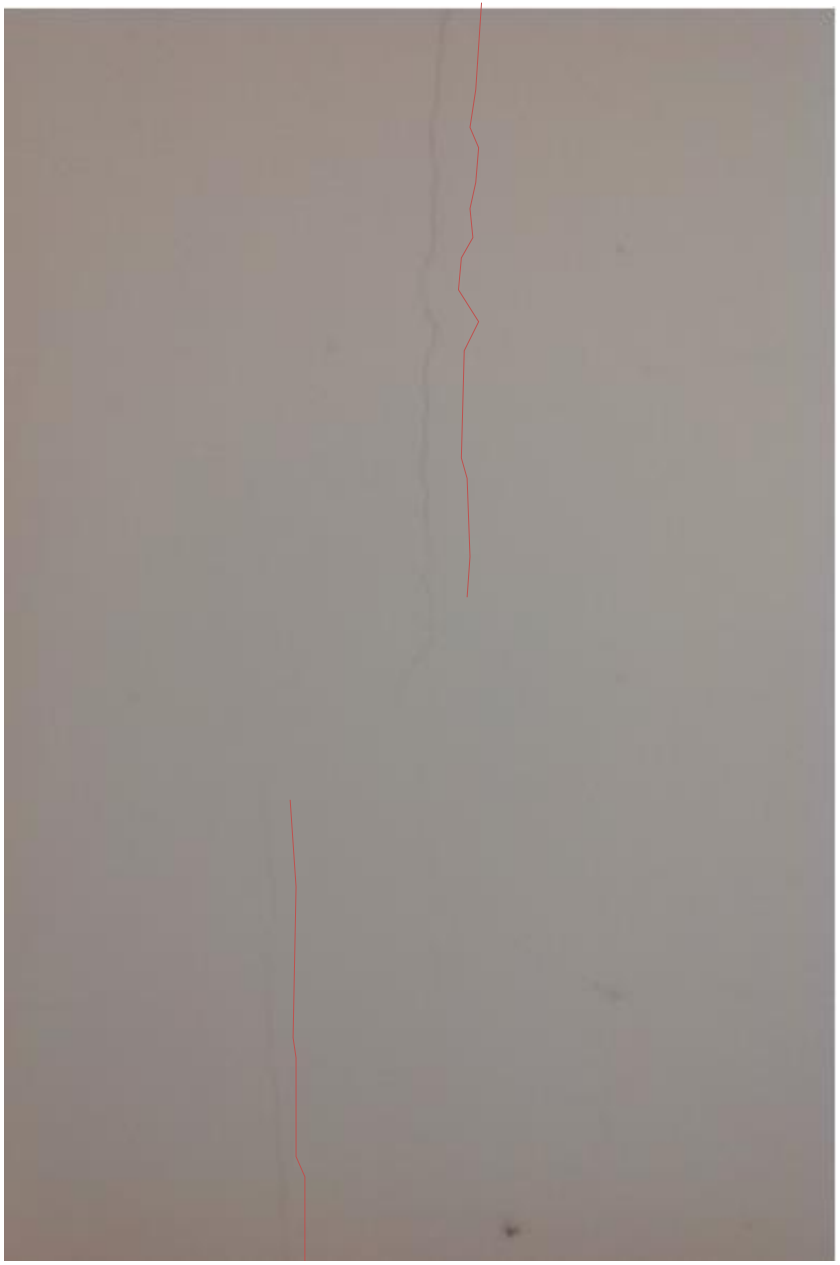
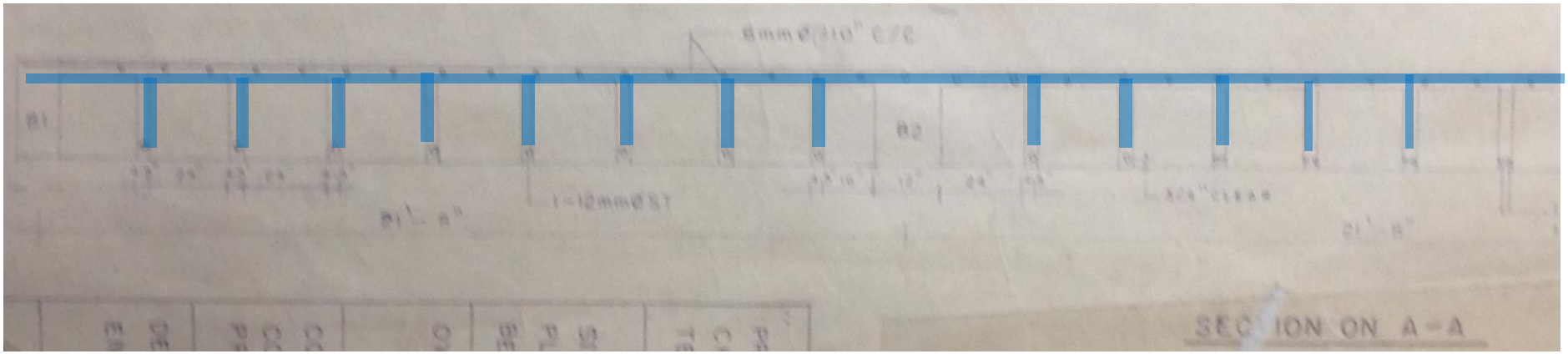


East Block floors appeared initially to be of flat slab construction. Long, relatively straight cracks could be seen on the slab soffits throughout the building – primarily running east-west but with some running north-south. There were often two or more cracks running parallel to each other.
Drawings indicate that a waffle slab has been constructed. The Factory engineer advised that waffles had been in-filled by permanent brickwork. This may be reflective of the crack lines. We are unclear how the brickwork is retained in position on the slab soffit.

Building Engineer to review and confirm that the above is correct and advise how brick formwork is retained in position to ensure that the slab soffit cracking does not develop further.

Cracking on underside of East Block floor slab



Section of waffle slab shown on structural drawing.

Cracking on underside of East Block floor slab

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Management of storage loads
- East & West Blocks

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Second Floor

Some level of Storage loads were observed on all floors.
Plan and height restrictions to be introduced to prevent future overloading.

Floor Storage loads

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Load capacity of external fire escape stairs

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External fire escape stairs. Building Engineer to verify that the structural load capacity of stairs and supports back to building structure are adequate for crowd loading.

External Fire Escape Stairs

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Condition of roof slab following demolition works – tidy-up, waterproofing and drainage to be provided

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Roof Level;

- **Remove construction material**
- **Provide waterproofing to damaged areas**
- **Provide a roof drainage system**

Works at Roof Level

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Priority Actions

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Problems Observed

ITEM 1; Columns appear to be stressed in excess of normal design limits – Building Engineer to verify concrete stresses and in-situ concrete strength

ITEM 2; Structural drawings provided were incomplete and do not fully represent the as- constructed building structure

ITEM 3; Visible sagging in mezzanine floor beams above Dining Area– East Block

ITEM 4; Lightweight steel roof to the East Block does not appear to be adequately braced to resist high wind loading

ITEM 5; Cracking to underside of floor slab throughout East Block

ITEM 6; Management of storage load in the East and West Blocks

ITEM 7; Load capacity of external fire escape stairs

ITEM 8; Condition of roof slab following demolition works – tidy-up, waterproofing and drainage to be provided

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Verify the structural adequacy of building columns at all levels based on as built dimensions and material properties	Factory Engineer to review design, loads and column stresses in area identified above.	**6-weeks**
2	Verify the structural adequacy of building columns at all levels based on as built dimensions and material properties	Verify insitu concrete strength either by cores or existing cylinder strength data for 8 building columns.	**6-weeks**
3	Verify the structural adequacy of building columns at all levels based on as built dimensions and material properties	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	**6-months**
4	Structural drawings provided were incomplete and do not fully represent the as-constructed building structure	Building Engineer to survey building structure and compare with structural drawings to identify any discrepancies.	**6-weeks**
5	Structural drawings provided were incomplete and do not fully represent the as-constructed building structure	Building Engineer to review the design calculations and confirm that the design (or an updated design if required) corresponds with the as-built structure.	**6-months**
6	Structural drawings provided were incomplete and do not fully represent the as-constructed building structure	As- constructed layout and structural drawings to be issued.	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
7	Visible sagging in mezzanine floor beams above Dining Area– East Block	Building Engineer to review structure and carry out design calculations to verify the load capacity that this floor system can safely carry.	**6-weeks**
8	Visible sagging in mezzanine floor beams above Dining Area– East Block	Allowable floor loading to be advised to ensure that storage loads comply with this restriction.	**6-weeks**
9	Visible sagging in mezzanine floor beams above Dining Area– East Block	On-going monitoring of loading required	**6-months**
10	Lightweight steel roof to the East Block does not appear to be adequately braced to resist high wind loading	Steel roof to the East Block should be designed by the Building Engineer including the provision of a lateral stability system and, if required, upgraded to support code vertical and wind loads or the area should be vacated and removed.	**6-weeks**
11	Cracking to underside of floor slab throughout East Block	Sections of plaster finish to slab to be removed to confirm that cracking is associated with lines of fin beams within waffle slab.	**6-weeks**
12	Cracking to underside of floor slab throughout East Block	Building Engineer to confirm that waffle slabs have been utilised.	**6-weeks**
13	Cracking to underside of floor slab throughout East Block	Building Engineer to confirm how waffle slab in-fills are restrained in position to ensure that the cracking pattern does not develop further.	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
14	Management of storage load in the East and West Blocks	Walkways to be provided within all storage areas	**6-weeks**
15	Management of storage load in the East and West Blocks	Building Engineer to produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	**6-weeks**
16	Load capacity of external fire escape stairs	Building Engineer to carry out design calculations to verify the load capacity of the external escape stairs for crowd loading in the event of use in an emergency.	**6-weeks**
17	Condition of roof slab following demolition works – tidy-up, waterproofing and drainage to be provided	Construction rubble / demolition material to be removed from building roof	**6-weeks**
18	Condition of roof slab following demolition works – tidy-up, waterproofing and drainage to be provided	Roof drainage system to be installed and concrete slab to be waterproofed at locations where the slab has been damaged.	**6-months**