Temakaw Fashion Ltd
KAW Garments Industry Ltd

808/1 & 808/2 Shewrapara, Mirpur, Dhaka.
(+23.790730N, 90.37535E)

06 May 2014

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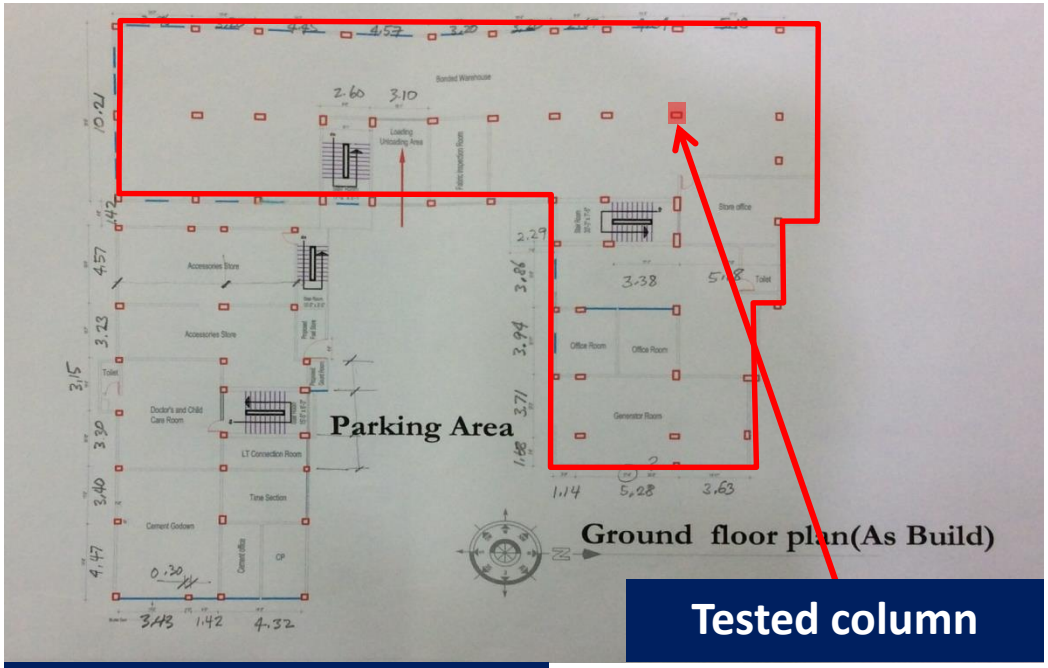
ARUP

Observations
Temakaw Fashion Ltd - Building 2

Columns appear to be stressed to a high level and require immediate review



Typical column layout

Tested Ground Floor Column – Stone Chips

Cursory calculations indicate that columns are stressed to a high level and require immediate review.

Building Engineer to perform detailed calculations including a Detail Engineering Assessment (see attached scope) and concrete tests to prove adequacy of column sizes, and (if required):

- **Reduce loads by vacating floors**
- **Reinforce columns**

Column Strength – Temakaw Fashion Ltd

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Management of floor loads & water tank loads at roof level

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Concrete water tanks above roof of stairs

Build up on toilet floors

Building Engineer to prepare controlled loading plans, based on floor slab and column capacity, for all floors which will designate allowable storage density and where storage may be placed.

Management of Floor & Water Tank Loads

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Structural adequacy of steel roof structures

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Building Engineer to check adequacy of the steel roof structure for code specified live load and wind loads

Steel Roof Structures

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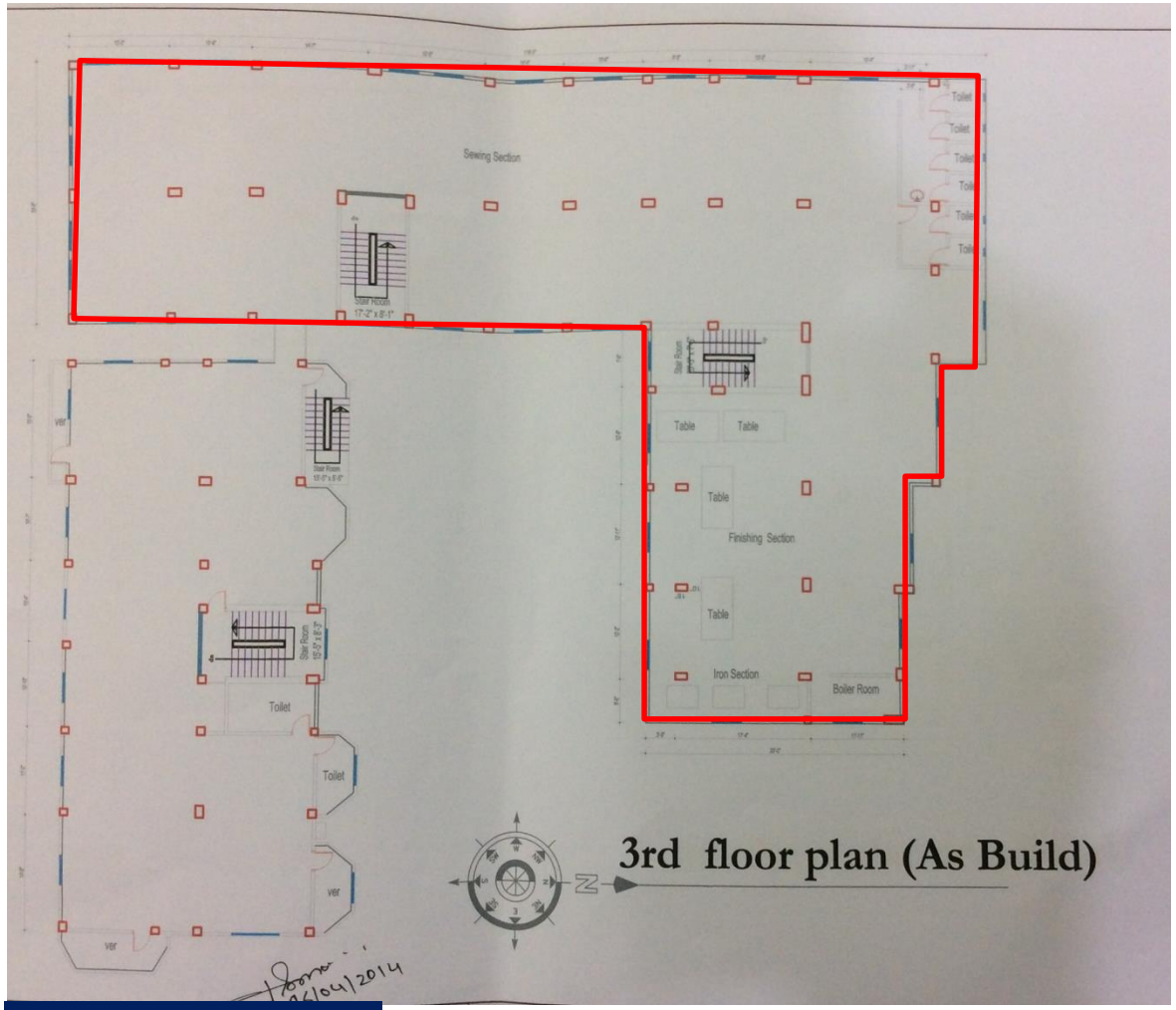
Missing structural drawings and discrepancies between drawings provided and the as-constructed building



Typical floor plan

Structural drawings for Building 2 - Temakaw were not available

Column sizes/grid dimensions do not all correspond with as built drawings.

Building Engineer as-built survey drawings to be updated.

Missing structural drawings and discrepancies

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Observations
KAW Garments Industry Ltd
Building 1

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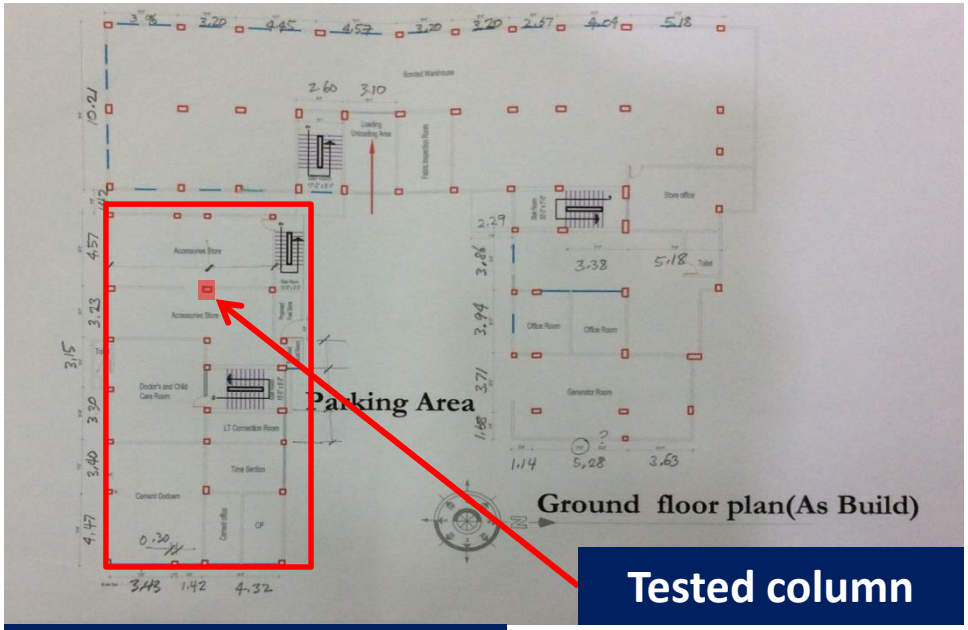
Columns appear to be stressed in excess of normal design limits



Typical column layout

Tested Ground Floor Column – Brick Chips

Cursory calculations indicate that columns are stressed in excess of normal design limits and require review.

Building Engineer to review design, loads and column stresses of columns and conduct concrete tests to prove adequacy of all column sizes, and (if required):

- **Reduce loads by vacating floors**
- **Reinforce columns**

Column Strength – KAW Garments Industry

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Management of floor loads & water tank loads at roof level

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Floor loads at 5th floor

Floor loads at 6th floor

2,000 litre plastic and concrete water tank above roof of stairs

Building Engineer to prepare controlled loading plans, based on floor slab and column capacity, for all floors which will designate allowable storage density and where storage may be placed.

Management of Floor & Water Tank Loads

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Structural adequacy of steel roof structures

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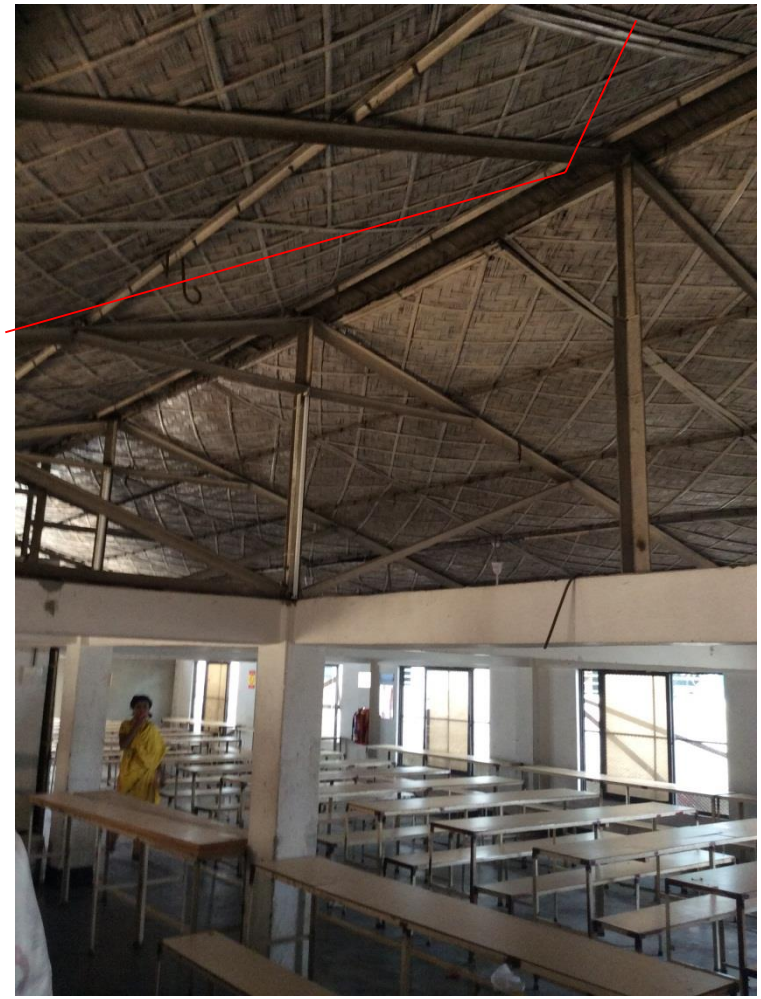

Building Engineer to check adequacy of the steel roof structure for code specified live load and wind loads

Steel Roof Structures

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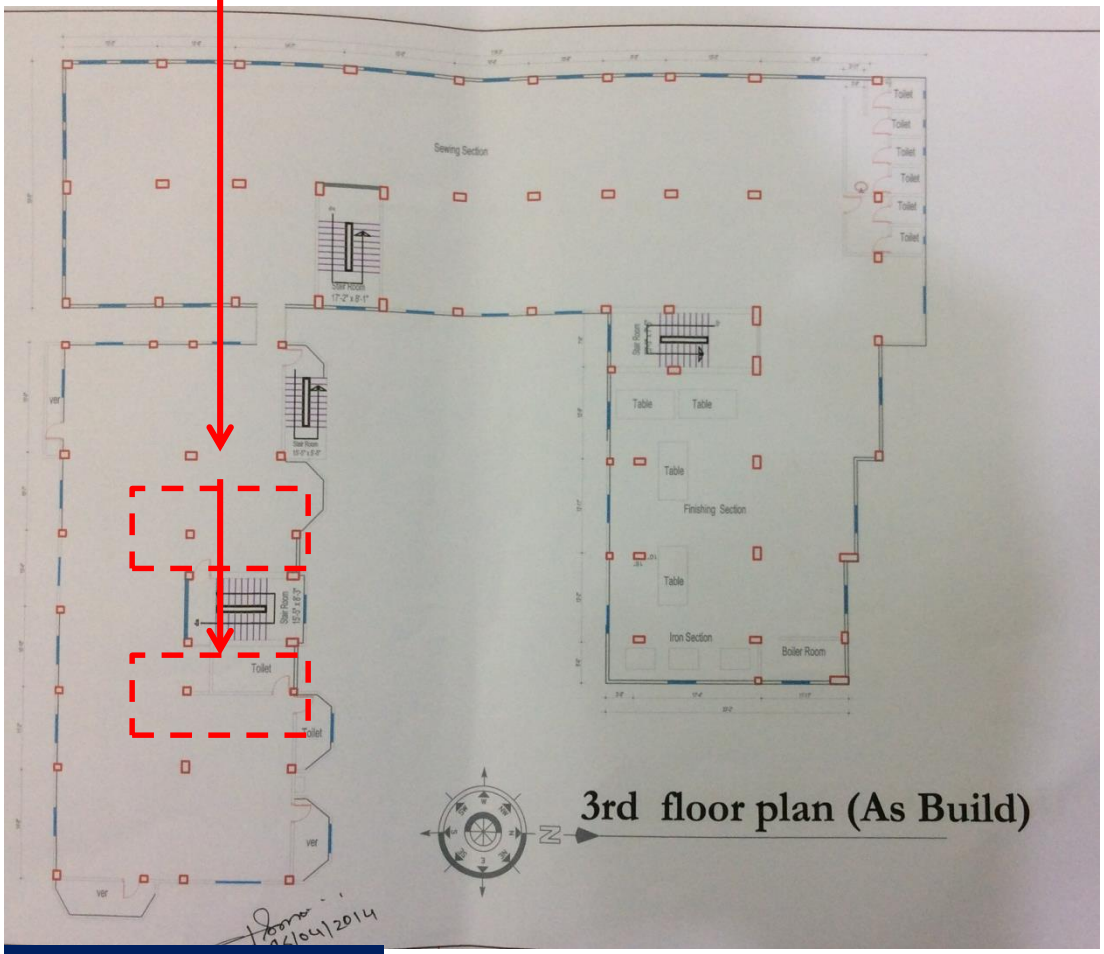
Missing structural drawings and discrepancies between drawings provided and the as-constructed building

Column do not line up contrary to layout shown on the survey drawings



Typical floor level

Structural drawings for Building 1 KAW were not available

Column sizes do not all correspond with as built drawings.

Building Engineer as-built survey drawings to be updated.

Missing structural drawings and discrepancies

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Retail at ground floor level

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Fast Food Outlet

Cement Shop

Retail at ground floor – KAW Building 1

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Priority Actions

Problems Observed

Temakaw Fashion Ltd - Building 2

ITEM 1: Columns appear to be stressed to a high level and require immediate review – including preparation of a Detail Engineering Assessment.

KAW Garments Industry Ltd - Building 1

ITEM 2: Columns appear to be stressed in excess of normal design limits.

Temakaw & KAW – Buildings 1 and 2

ITEM 3: Management of floor loads & water tank loads at roof level

ITEM 4: Structural adequacy of steel roof structures

ITEM 5: Missing structural drawings and discrepancies between drawings provided and the as constructed building.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Columns appear to be stressed to a high level and require immediate review	Factory Engineer to review design, loads and column stresses in all columns in Building 2.	**Immediate - Now**
2	Columns appear to be stressed to a high level and require immediate review	Verify insitu concrete strength either by 100mm diameter cores or existing cylinder strength data for cores from 4 columns . Verify grade of steel reinforcement used.	**Immediate - Now**
3	Columns appear to be stressed to a high level and require immediate review	A Detail Engineering Assessment of Building 2 to be commenced, see attached Scope.	**Immediate - Now**
4	Columns appear to be stressed to a high level and require immediate review	Detail Engineering Assessment for Building 2 to be completed.	**6-weeks**
5	Columns appear to be stressed to a high level and require immediate review	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	**6-weeks**
6	Columns appear to be stressed to a high level and require immediate review	Continue to implement load 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. 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
7	KAW Garments Industry Ltd - Building 1 Columns within Building 1 KAW Garments Industry Ltd appear to be stressed in excess of normal design limits	Building Engineer to review design, loads and column stresses in area identified above.	**6-weeks**
8	KAW Garments Industry Ltd - Building 1 Columns within Building 1 KAW Garments Industry Ltd appear to be stressed in excess of normal design limits	Verify insitu concrete strength either by 100mm diameter cores or existing cylinder strength data for cores from 4 columns	**6-weeks**
9	KAW Garments Industry Ltd - Building 1 Columns within Building 1 KAW Garments Industry Ltd appear to be stressed in excess of normal design limits	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.	**6-months**
10	Building 1 and 2 Management of floor loads & water tank loads at roof level	Produce and actively manage a loading plan for all floor plates and the roof within the factory giving consideration to floor capacity and column capacity.	**6-weeks**
11	Building 1 and 2 Management of floor loads & water tank loads at roof level	Continue to implement load plan	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
12	Building 1 and 2 Structural adequacy of steel roof structures	The steel roofs in Buildings 1 and 2 should be designed by the Building Engineer and, if required, upgraded to support code vertical and wind loads.	**6-months**
13	Building 1 and 2 Missing structural drawings and discrepancies between drawings provided and the as constructed building	Commence check of survey of as constructed building	**6-weeks**
14	Building 1 and 2 Missing structural drawings and discrepancies between drawings provided and the as constructed building	Building Engineer to update survey of as constructed building. Updated drawings to be prepared showing the correct as constructed layout.	**6-months**
15	Building 1 and 2 Missing structural drawings and discrepancies between drawings provided and the as constructed building	Prepare controlled loading plans for all floors designating allowable storage density and where storage may be placed	**6-months**