

# Nipa Fashion Wear Company Ltd.

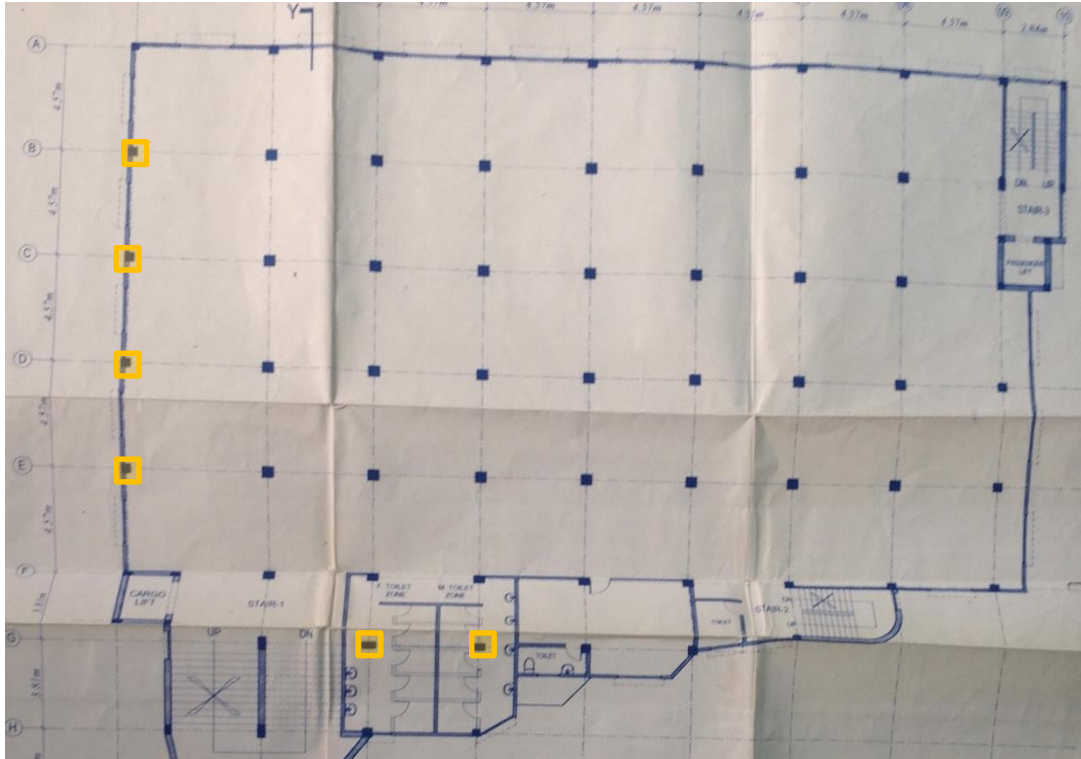
Holan Road, Dakkin Khan, Uttara, Dhaka – 1230  
(23.856611N, 90.431042E)

13 July 2014



# Observations

# **Cursory Calculations indicate High Column Stress**



Cursory calculations indicate high column stresses.

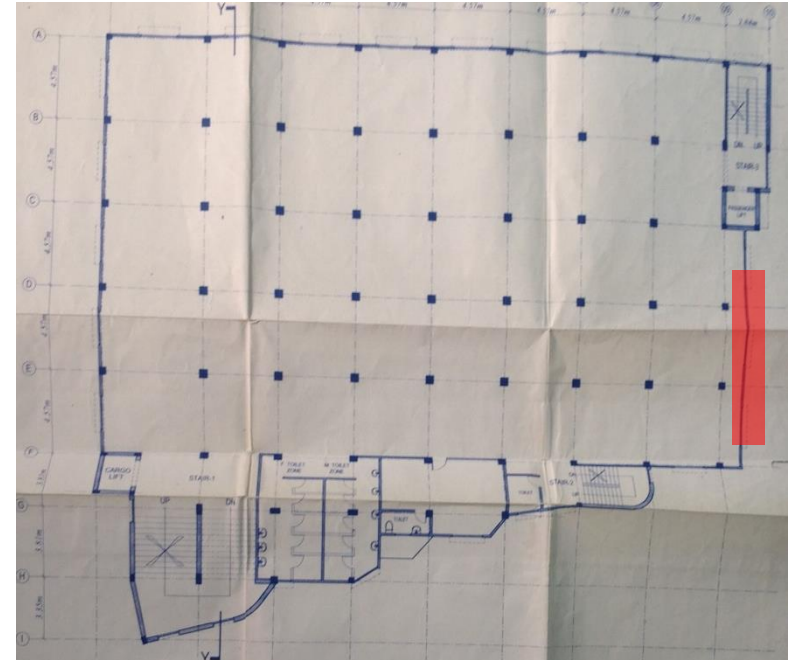


Stone Aggregate observed in columns

# **Function of Masonry Columns Centred on Construction Joint, not Apparent**



Purpose of masonry columns not apparent.



Masonry Columns constructed at junction of factories

# Function of Column Strengthening Works Not Apparent



Columns strengthening work observed on internal columns at 1<sup>st</sup> Floor only.

Function of steel angles and plates fixed to columns not apparent.



Reason and Function of Plates bolted to underside of flat slab (soffit 1<sup>st</sup> Floor) and welded to steel angles not apparent.

Observed loading on 2<sup>nd</sup> floor slab 2kPa. Use of 2<sup>nd</sup> floor slab was sewing.



Cracking observed in plaster finish to one of the columns at 1<sup>st</sup> Floor where the column strengthening was observed

# **Movement Joint/Structural Separation of Factories Not Identifiable in All Areas**



Separate Factory not part of Nipa Fashion Wear Industries Ltd

Movement joint in factory Facade

Correctly detailed movement joint not apparent in masonry façade or slab.



Steel Structure Bridges movement joint at roof level.

Location of movement joint in roof slab not apparent, none in steel roof cover.



Masonry columns at ground floor apparently centred on movement joint

# Uncontrolled Material Storage



5<sup>th</sup> Floor: Uncontrolled Finished Goods storage



5<sup>th</sup> Floor: Uncontrolled Finished Goods storage

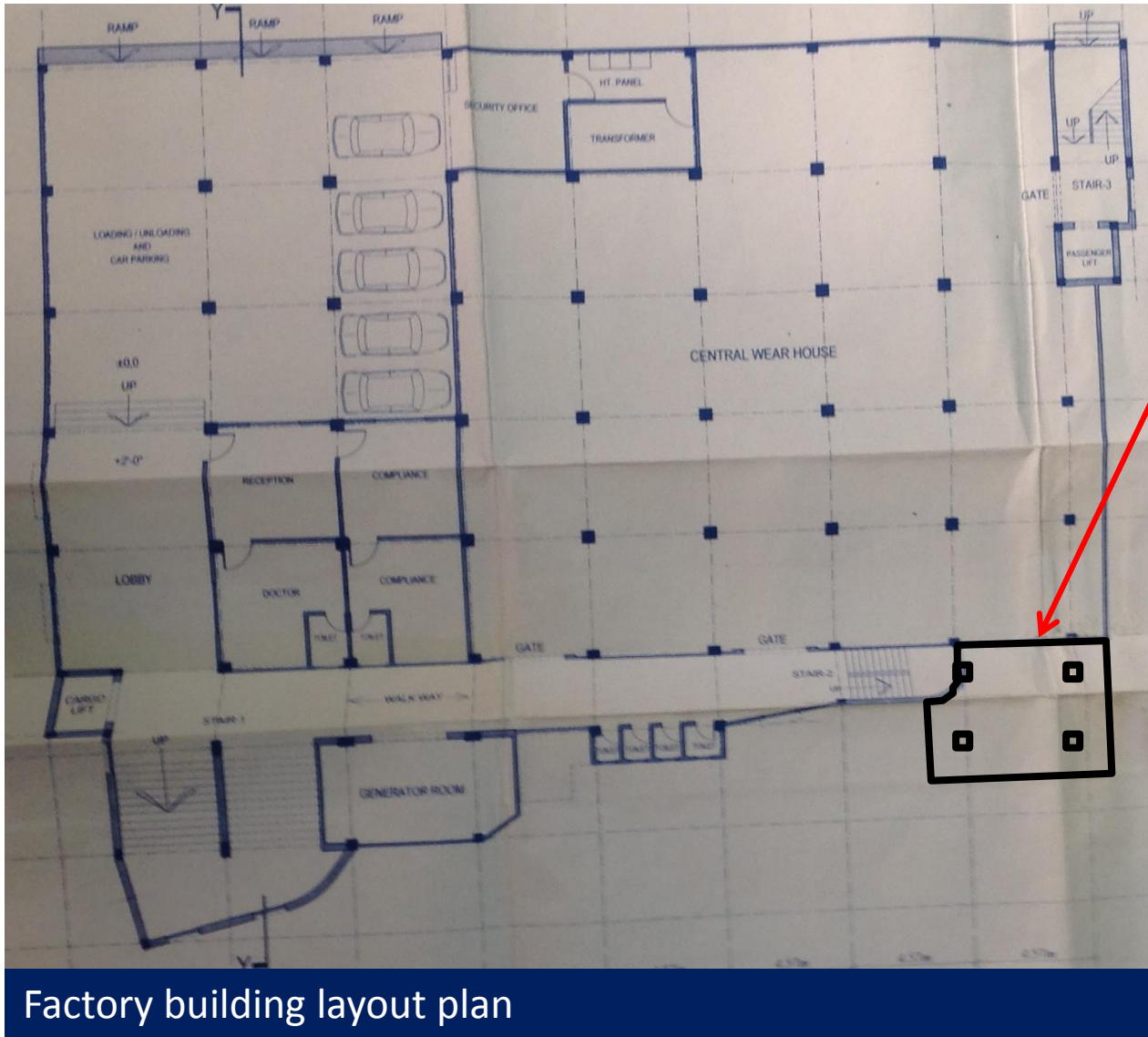


4<sup>th</sup> Floor: Uncontrolled Finished Goods storage



4<sup>th</sup> Floor: Uncontrolled Fabric storage

# **Inconsistencies Noted Between Structural Drawings and As Built Structure**

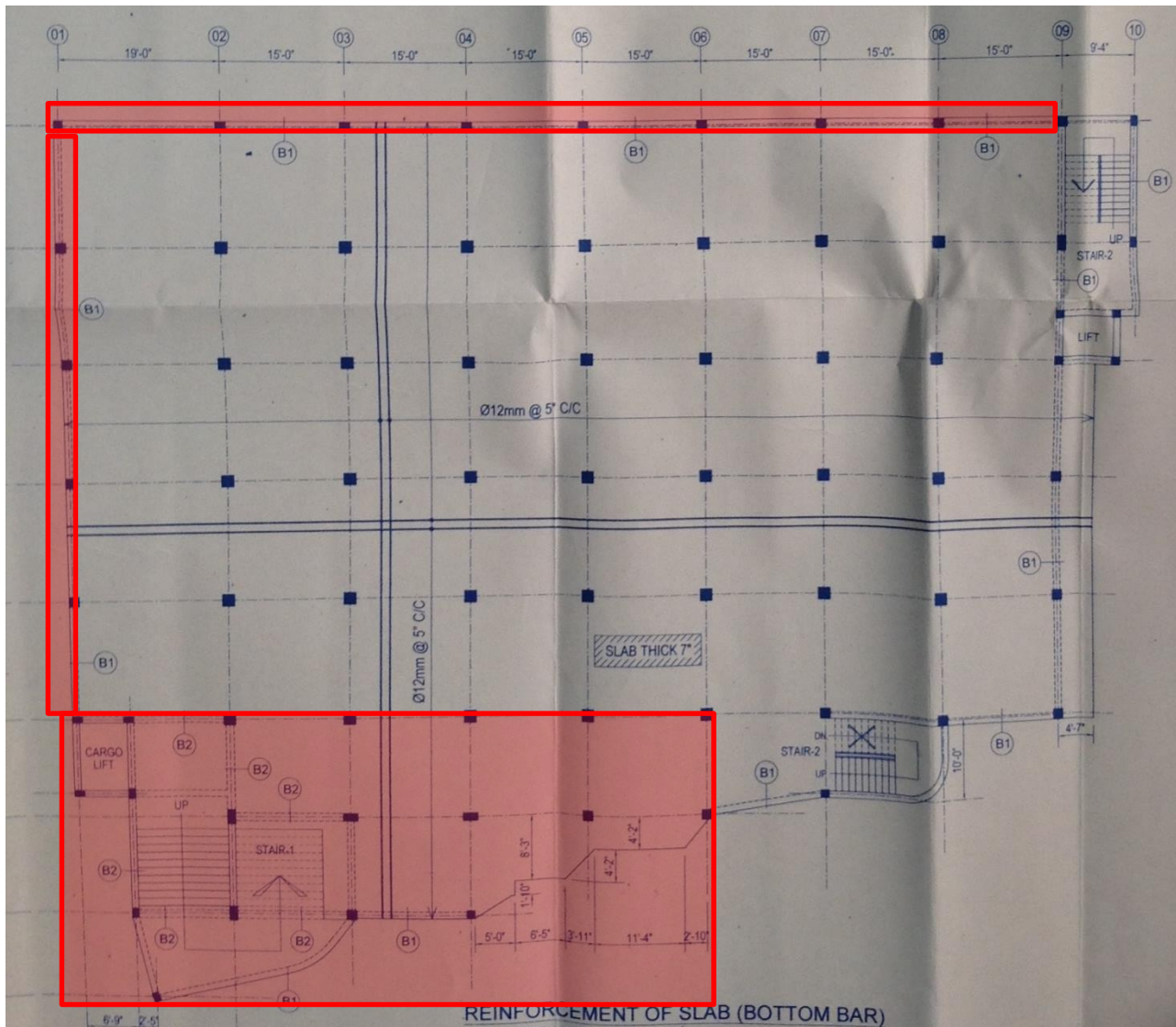


Six storey concrete structure not present on Permit, Structural or Architectural drawings.

No documentation of any kind pertaining to this structure was present on day of factory Inspection

Factory building layout plan

## Observations

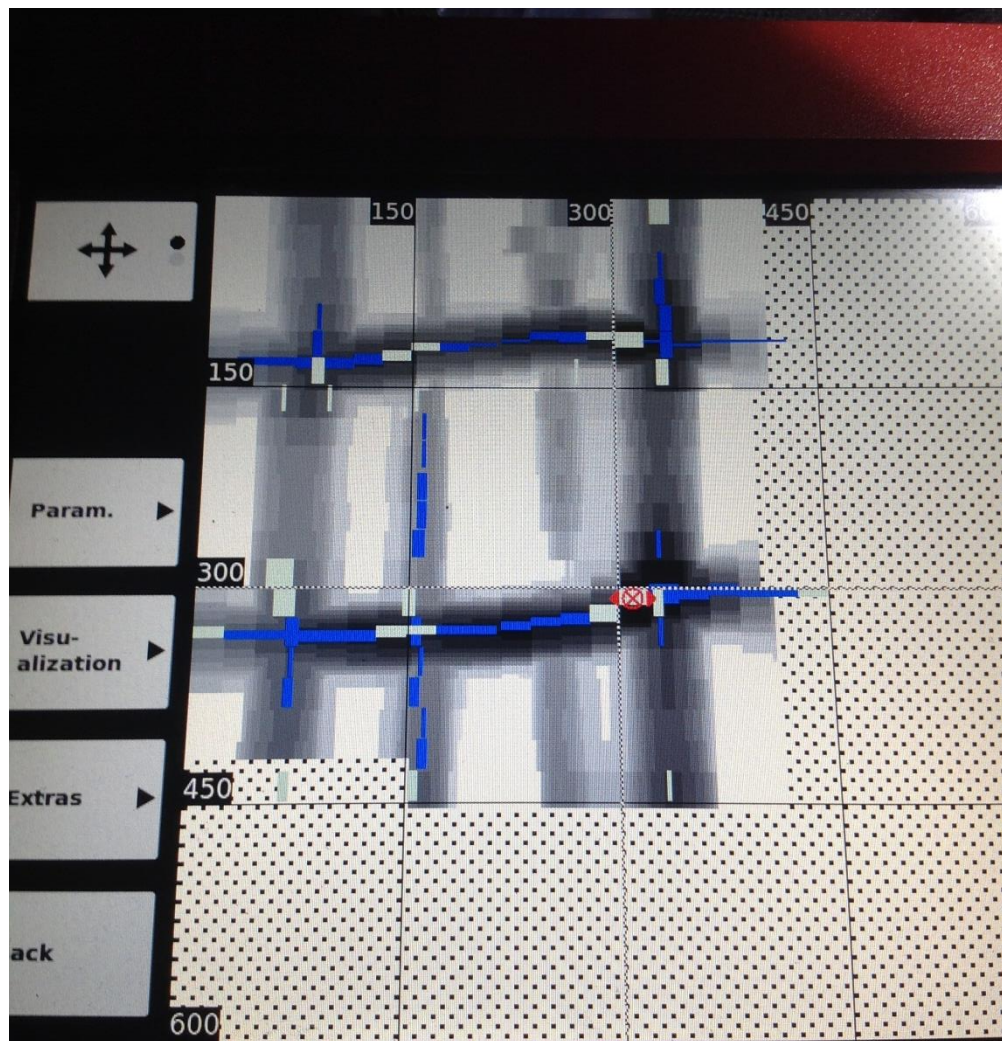


Perimeter beams shown on structural drawings not constructed.

As Built beam layout in Stair Core and Toilet area not consistent with structural drawings

Practical beam layout

## Observations



Ferro scan of internal column (C4) confirmed 4 bars in each face.

| INDEX | QTY | SIZE OF COLUMN<br>BELOW DL | ABOVE DL  | M.S. ROD FOR<br>GROUND & 1ST FLOOR      | M.S. ROD FOR<br>2ND & 3RD FLOOR         | M.S. ROD FOR<br>4TH & 5TH FLOOR         | M.S. ROD FOR<br>6TH & 7TH FLOOR        |
|-------|-----|----------------------------|-----------|-----------------------------------------|-----------------------------------------|-----------------------------------------|----------------------------------------|
| C1    | 02  | 17" x 17"                  | 15" x 15" | 8-Ø25mm<br>T.E. Ø10mm @ 8" C/C          | 4-Ø25 + 4-Ø20mm<br>T.E. Ø10mm @ 8" C/C  | 8-Ø20mm<br>T.E. Ø10mm @ 8" C/C          | 8-Ø20mm<br>T.E. Ø10mm @ 8" C/C         |
| C2    | 15  | 17" x 17"                  | 15" x 15" | 12-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 8-Ø25 + 4-Ø20mm<br>T.E. Ø10mm @ 8" C/C  | 4-Ø25 + 8-Ø20mm<br>T.E. Ø10mm @ 8" C/C  | 12-Ø20mm<br>T.E. Ø10mm @ 8" C/C        |
| C3    | 03  | 18" x 18"                  | 16" x 16" | 12-Ø25 + 4-Ø20mm<br>T.E. Ø10mm @ 8" C/C | 12-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 8-Ø25 + 4-Ø20mm<br>T.E. Ø10mm @ 8" C/C  | 4-Ø25 + 8-Ø20mm<br>T.E. Ø10mm @ 8" C/C |
| C4    | 29  | 18" x 18"                  | 16" x 16" | 16-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 12-Ø25 + 4-Ø20mm<br>T.E. Ø10mm @ 8" C/C | 12-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 8-Ø25 + 4-Ø20mm<br>T.E. Ø10mm @ 8" C/C |
| C5    | 04  | 18" x 18"                  | 16" x 16" | 20-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 16-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 12-Ø25 + 4-Ø20mm<br>T.E. Ø10mm @ 8" C/C | 12-Ø25mm<br>T.E. Ø10mm @ 8" C/C        |
| C6    | 10  | 12" x 17"                  | 10" x 15" | 8-Ø25mm<br>T.E. Ø10mm @ 8" C/C          | 8-Ø25mm<br>T.E. Ø10mm @ 8" C/C          | 4-Ø25 + 4-Ø20mm<br>T.E. Ø10mm @ 8" C/C  | 8-Ø20mm<br>T.E. Ø10mm @ 8" C/C         |
| C7    | 06  | 12" x 22"                  | 10" x 20" | 14-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 12-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 10-Ø25mm<br>T.E. Ø10mm @ 8" C/C         | 8-Ø25mm<br>T.E. Ø10mm @ 8" C/C         |
| C8    | 04  | 12" x 17"                  | 10" x 15" | 8-Ø25mm<br>T.E. Ø10mm @ 8" C/C          | 8-Ø25mm<br>T.E. Ø10mm @ 8" C/C          | 8-Ø20mm<br>T.E. Ø10mm @ 8" C/C          | 8-Ø20mm<br>T.E. Ø10mm @ 8" C/C         |

Column Reinforcement Schedule does not match As Built Construction.

For Column C4 Reinforcement Schedule specifies 16 No. - 25mm diameter bars.



Single Storey Shed only present on Industrial Permit drawing.

No Structural drawing or Structural information pertaining to Single Storey Shed was present on day of inspection



Building 2 - Single Storey Shed

## Observations

# Problems Observed

1. Cursory Calculations indicate Column Stress is in Excess of Design Limits
2. Function of Column Strengthening Works Not Apparent
3. Function of Masonry Columns at Ground Floor, Centred on Construction Joint, not Apparent
4. Movement Joint/Structural Separation of Factories Not Identifiable in All Areas
5. Uncontrolled Material Storage
6. Inconsistencies Noted Between Structural Drawings and As Built Structure

| Item No. | Observation                                                               | Recommended Action Plan                                                                                                                        | Recommended Timeline   |
|----------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1        | Cursory Calculations indicate Column Stress is in Excess of Design Limits | Maintain current use of the floors and don't change use or increase occupation, either of which could increase loading.                        | <b>Immediate - Now</b> |
| 2        | Cursory Calculations indicate Column Stress is in Excess of Design Limits | Factory Engineer to review design, loads and columns stresses in all columns.                                                                  | <b>Immediate - Now</b> |
| 3        | Cursory Calculations indicate Column Stress is in Excess of Design Limits | Verify insitu concrete stresses either by 100mm diameter cores or existing cylinder strength data for cores from 4 columns.                    | <b>Immediate - Now</b> |
| 4        | Cursory Calculations indicate Column Stress is in Excess of Design Limits | A Detail Engineering Assessment of Factory to be commenced, see attached Scope.                                                                | <b>Immediate - Now</b> |
| 5        | Cursory Calculations indicate Column Stress is in Excess of Design Limits | Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity. | <b>6-weeks</b>         |
| 6        | Cursory Calculations indicate Column Stress is in Excess of Design Limits | Detail Engineering Assessment to be completed.                                                                                                 | <b>6-weeks</b>         |
| 7        | Cursory Calculations indicate Column Stress is in Excess of Design Limits | Continue to implement load plan                                                                                                                | <b>6-months</b>        |

# Detail Engineering Assessment (DEA)

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

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

| Item No. | Observation                                                                              | Recommended Action Plan                                                                                                                                                                  | Recommended Timeline |
|----------|------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 8        | Function of Column Strengthening Works Not Apparent                                      | Building Engineer to investigate extent of cracking in column finishes . Finishes should be removed to investigate if crack penetrates concrete column.                                  | 6-weeks              |
| 9        | Function of Column Strengthening Works Not Apparent                                      | Building Engineer to identify function of column strengthening works and confirm adequacy of current measures.                                                                           | 6-weeks              |
| 10       | Function of Column Strengthening Works Not Apparent                                      | Building Engineer to design and detail Structural Upgrading work if necessary                                                                                                            | 6-weeks              |
| 11       | Function of Masonry Columns at Ground Floor, Centred on Construction Joint, not Apparent | Building Engineer to investigate function and construction method of columns identified above, with particular attention to be paid to location of column in relation to movement joint. | 6-months             |
| 12       | Function of Masonry Columns at Ground Floor, Centred on Construction Joint, not Apparent | Building Engineer to Design and detail Structural Upgrading works as necessary                                                                                                           | 6-months             |

| Item No. | Observation                                                                     | Recommended Action Plan                                                                                                                                                                                                                 | Recommended Timeline |
|----------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 13       | Movement Joint/Structural Separation of Factories Not Identifiable in All Areas | Building Engineer to confirm the line of Structural separation of all structural elements, and confirm adequacy of structure either side of joint. Particular attention to be given to items identified in observations of this report. | 6-months             |
| 14       | Movement Joint/Structural Separation of Factories Not Identifiable in All Areas | Building Engineer to update Structural drawings were necessary                                                                                                                                                                          | 6-months             |
| 15       | Implementation of load management plan                                          | Building engineer to clearly display allowable floor loading on all floors of factory building based on loading plans in DEA.                                                                                                           | 6-months             |
| 16       | Implementation of load management plan                                          | Building Engineer to monitor storage on all upper floors and ensure compliance with loading plans.                                                                                                                                      | 6-months             |