

# Samad Sweater Limited

Kalmeshwar (Battala Road) Board Bazar, Gazipur  
(23.945658, 90.385032)

07<sup>th</sup> May 2017





# Observations

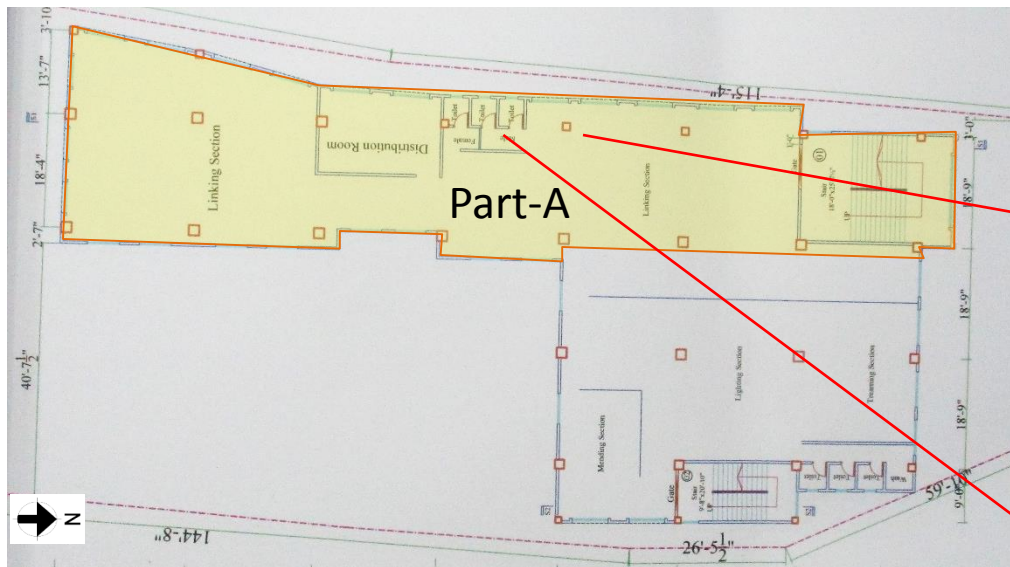


# Punching shear stress levels in flat slabs

**Observations: Production Building**



Cursory calculations indicate that punching shear stresses in flat slab floors at corner columns around toilets and at internal columns are in excess of normal design limits.



Second Floor Layout Plan



Flat slab up to 2<sup>nd</sup> floor



Brick aggregate observed



Toilet zone with build up



# Mismatch in beam layout

**Observations: Production Building**



In beam layout of Part-B conceal beam was shown but 10" x 20" size beam found. All floor beams are shown as conceal beam in drawings. Also in Part-A cantilever beams were not found in stair and north side toilet which were shown in beam layout.



Cantilever without beam



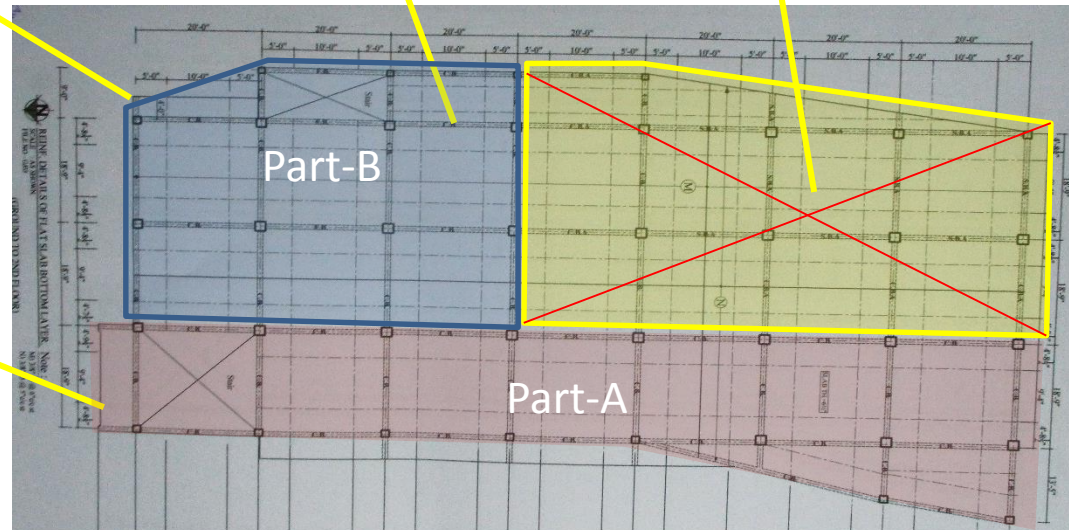
Floor beam at part-B



Up to 1<sup>st</sup> floor construction at part-C



Cantilever at stair without beam



Beam Layout

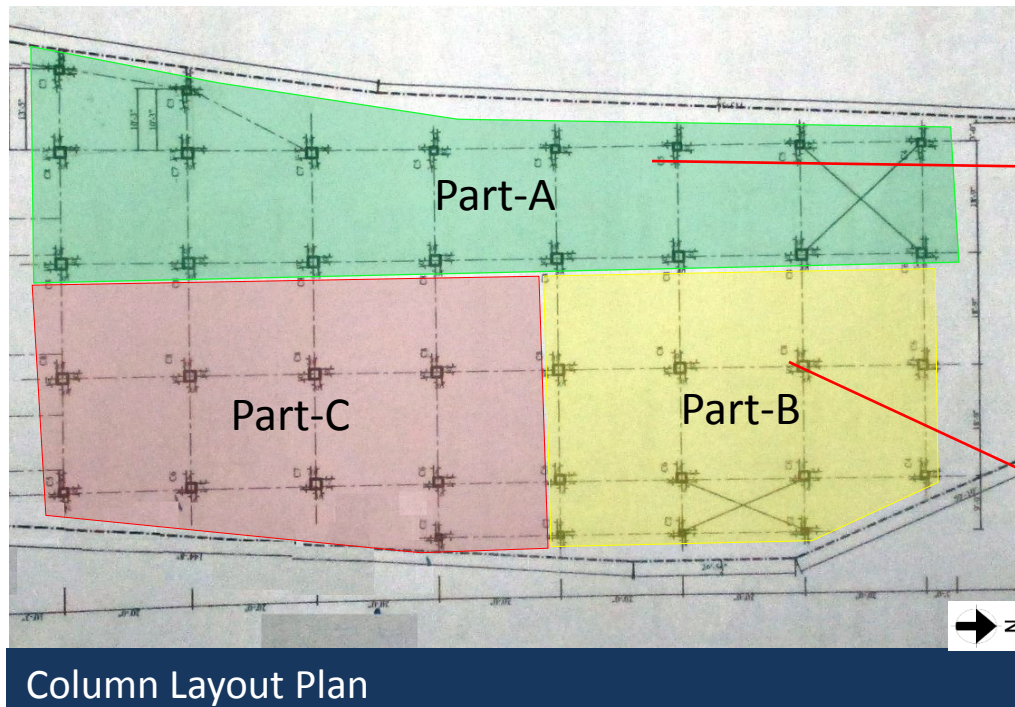


# Overall stability system

**Observations: Production Building**



Concerns on the stability system for lateral loading and seismic loading. Flat slab system lack of lateral load resistance.



Column Layout Plan



Flat slab up to 2<sup>nd</sup> floor



Beam slab

Factory requires that these items be investigated as part of a Detailed Engineering Assessment.

## Observations: Production Building



# **Water logging at roof and dampness due to water logging**

**Observations: Production Building**



Water ponding at roof



Water ponding at roof



Water ingress at 4<sup>th</sup> floor slab soffit

Water ponding was noted on the roof slab.

Water ingress was found on the 4<sup>th</sup> floor slab soffit.



# Expose rebar and wastage on roof

**Observations: Production Building**



Slab reinforcement is left exposed at South and East. Column reinforcement is also exposed at roof. It is unclear whether rust proof paint is applied.



Wastage materials are stacked at roof. Factory is required remove all the wastage from roof.



**No edge protection at North-east side  
on roof**

**Observations: Production Building**



No edge protection provided at North-east to the roof



# Columns suspected to vehicle impact

**Observations: Production Building**

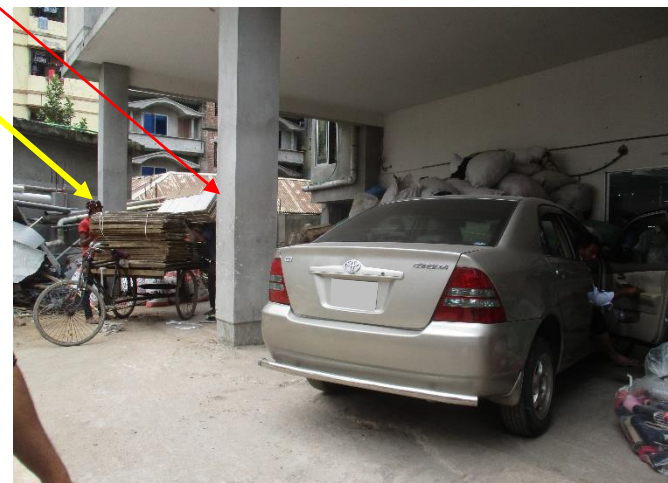


Ground floor layout plan (Loading/unloading area)

Impact protection not provided to columns at loading – unloading area. Columns were suspected to have impact loading from vehicles.



Loading/unloading area



Loading/unloading area

## Structural System – Factory Building



# Lack of drawings for all sheds



Roof shed



Roof shed without truss



Stair core roof



Shed-1



Shed-2



Shed-3

Structural and architectural drawings were not available for all sheds. Only layout plan was available for shed -1 & 2 which didn't match with as-built condition.

## Observations: Production Building



# Apparently non engineered shed

**Observations: Production Building**



Roof shed with truss



Roof shed without truss



Stair core roof



Shed-1



Shed-2



Shed-3

Steel structures to the shed buildings contain small steel sections and lateral stability structural systems are unclear. Building Engineer to carry out a lateral stability analysis of the shed buildings.



# Problems Observed

## Production Building:

- Item-1:** Punching shear stress levels in flat slabs.
- Item-2:** Mismatch in beam layout.
- Item-3:** Overall stability system.
- Item-4:** Water logging at roof and dampness due to water logging.
- Item-5:** Expose rebar and wastage on roof.
- Item-6:** No edge protection at North-east side on roof.
- Item-7:** Columns suspected to vehicle impact.

## Shed Building:

- Item-8:** Lack of drawings for all sheds.
- Item-9:** Apparently non engineered shed.



| Item No. | Observation                                                          | Recommended Action Plan                                                                                                                        | Recommended Timeline   |
|----------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1        | (Production Building)<br>Punching shear stress levels in flat slabs. | Factory Engineer to review design, loads and punching shear stresses in all slabs at internal columns and in toilet areas.                     | <b>Immediate - Now</b> |
| 2        | (Production Building)<br>Punching shear stress levels in flat slabs. | Verify insitu concrete strength by taking 100mm diameter cores from a minimum of 4 non-critical locations in slabs.                            | <b>Immediate - Now</b> |
| 3        | (Production Building)<br>Punching shear stress levels in flat slabs. | A Detail Engineering Assessment of Factory to be commenced, see attached Scope.                                                                | <b>Immediate - Now</b> |
| 4        | (Production Building)<br>Punching shear stress levels in flat slabs. | Make structural alterations as advised by Factory Engineer.                                                                                    | <b>6-weeks</b>         |
| 5        | (Production Building)<br>Punching shear stress levels in flat slabs. | Produce and actively manage a loading plan for all floor plates within the factory, giving consideration to slab capacity and column capacity. | <b>6-weeks</b>         |
| 6        | (Production Building)<br>Punching shear stress levels in flat slabs. | Detail Engineering Assessment to be completed.                                                                                                 | <b>6-weeks</b>         |
| 7        | (Production Building)<br>Punching shear stress levels in flat slabs. | Continue to implement load plan.                                                                                                               | <b>6-months</b>        |



# 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 ACCORD DEA guideline , ACCORD standard for Assessment of Structural Integrity of Existing RMG Factory Buildings in Bangladesh (Tripartite Document), the latest version of these document should be referenced. These 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 Elevation 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 ACCORD DEA guideline , ACCORD standard 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 see ACCORD DEA guideline & ACCORD standard more details.
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 ACCORD DEA guideline & ACCORD standard (<http://bangladeshaccord.org/factories/resource-centre/>).



| Item No. | Observation                                                                       | Recommended Action Plan                                                                                                                      | Recommended Timeline |
|----------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 8        | (Production Building)<br>Mismatch in beam layout                                  | Building Engineer is required to survey the as-built structure and prepare the accurate as-built structural drawings.                        | 6-weeks              |
| 9        | (Production Building)<br>Overall stability system                                 | Carry out a Detail Engineering Assessment on the buildings to verify that they are stable under lateral loading.                             | 6-weeks              |
| 10       | (Production Building)<br>Overall stability system                                 | Carry out all recommendations of the Detail Engineering Assessment.                                                                          | 6-months             |
| 11       | (Production Building)<br>Overall stability system                                 | Continue to implement the load plan.                                                                                                         | 6-months             |
| 12       | (Production Building)<br>Water logging at roof and dampness due to water logging. | Waterproofing on the roof slab is to be applied. In addition, the roof slab drainage system should be investigated and improved if required. | 6-weeks              |
| 13       | (Production Building)<br>Expose rebar and wastage on roof                         | All exposed reinforcement is required to protect from corrosion which may cause degradation of the concrete.                                 | 6-weeks              |



| Item No. | Observation                                                            | Recommended Action Plan                                                                                                 | Recommended Timeline |
|----------|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------|
| 14       | (Production Building)<br>No edge protection at North-east side on roof | Provide proper edge protection to the roof.                                                                             | 6-weeks              |
| 15       | (Production Building)<br>Columns suspected to vehicle impact           | Install a barrier to prevent vehicle impact in column.                                                                  | 6-weeks              |
| 16       | (Shed-1, 2 & 3)<br>Lack of drawings for all sheds                      | Building Engineer to survey as-built structure and prepare accurate as-built survey information for steel part.         | 6-weeks              |
| 17       | (Shed- 1, 2 & 3)<br>Apparently non engineered shed                     | Engage a qualified structural engineer to confirm satisfactory structural performance of these shed under wind loading. | 6-weeks              |
| 18       | (Shed- 1, 2 & 3)<br>Apparently non engineered shed                     | Remedial works to be carried out if required                                                                            | 6-months             |