

Pole Star Fashion & Design Ltd.

Sharifpur, National University, Gazipur, Bangladesh
(23.96554N, 90.36843E)

06 April 2014

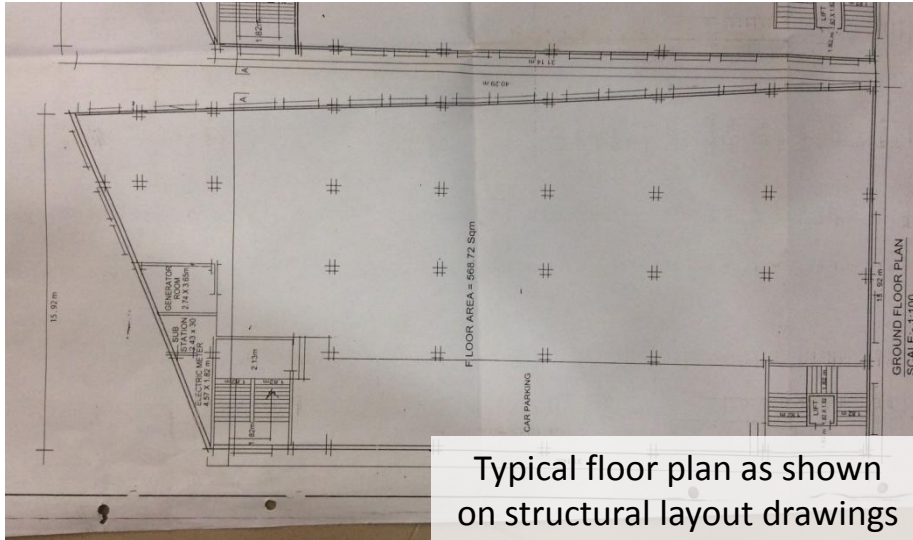


Observations

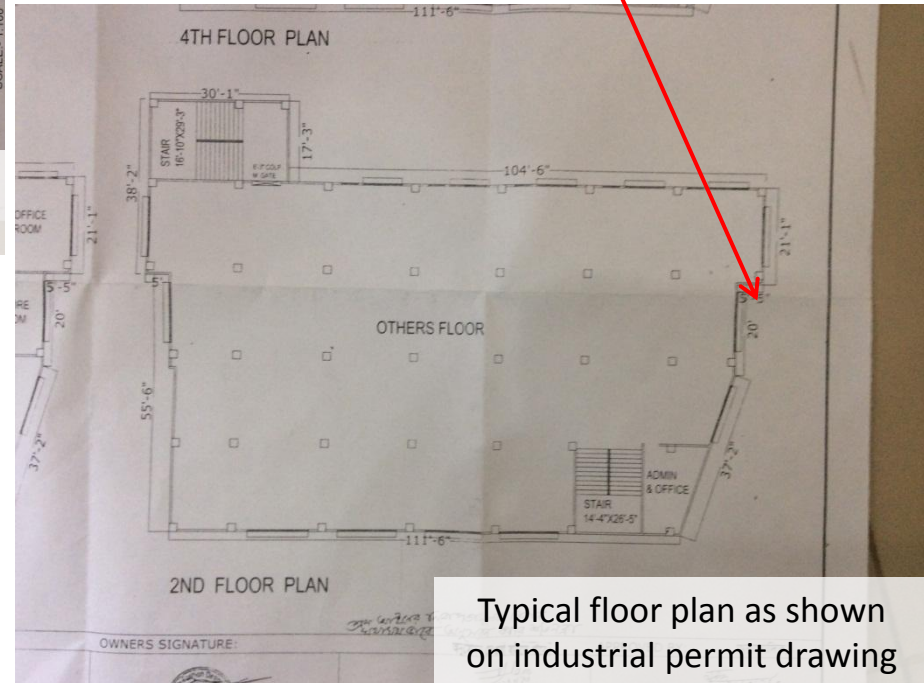
Structural plans do not align with as-built layouts

Structural layout drawings do not match as-built layout or industrial permit drawings.

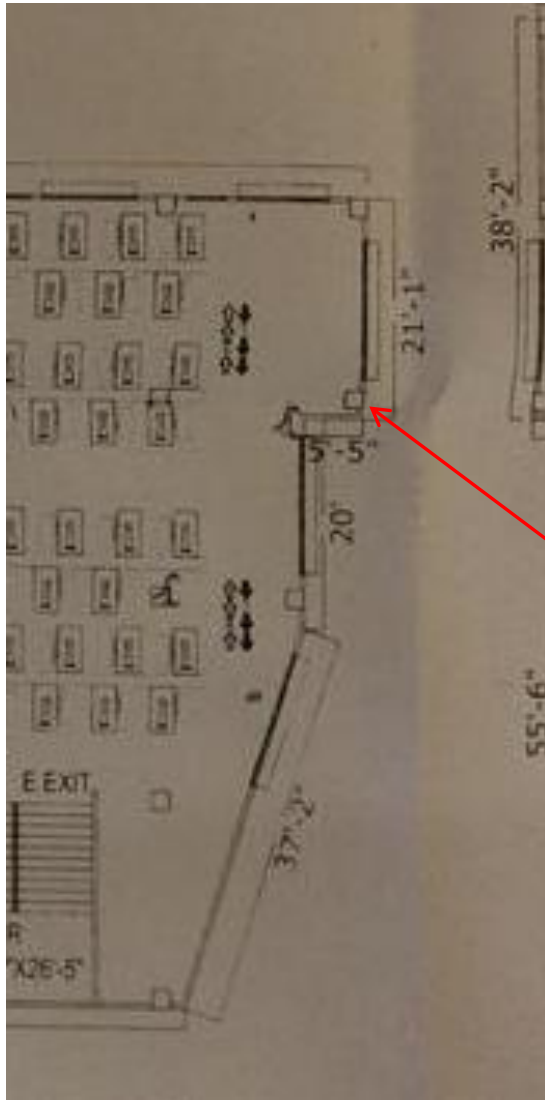
Engineer to produce as-built drawings that are consistent with building frame.



Building cantilevers beyond column line at first floor and above. As-built drawings to be created to suit



Edge beam eccentricity



Building plans do not correspond with as-built structural framing.

Beams and columns shown to line through on drawings but are offset in reality. Engineer to confirm that beam has been designed and detailed for torsion and that column is designed for beam eccentricity.

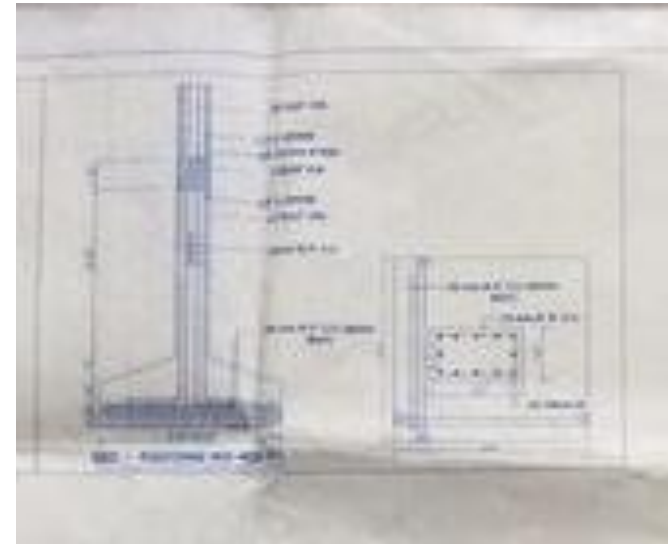
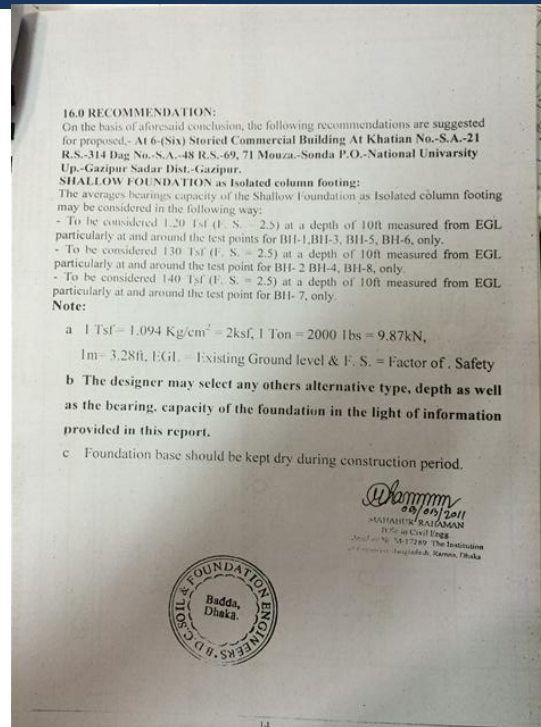
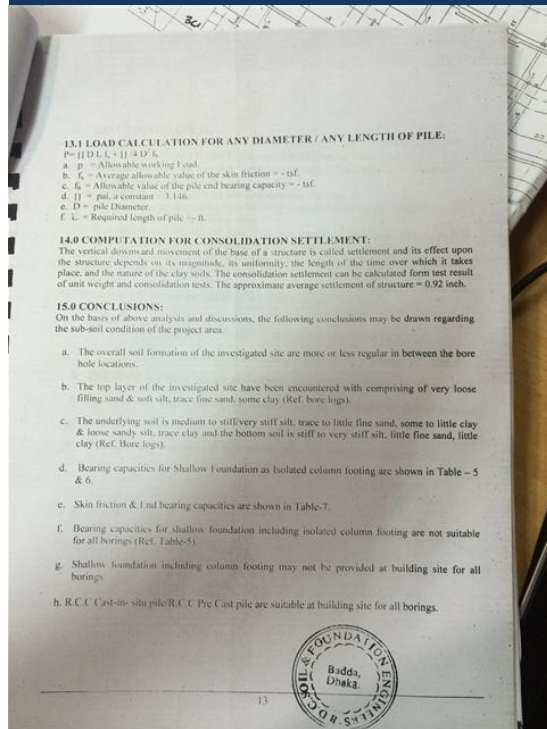


Edge beam eccentricity

Foundations & surrounding ground conditions

Foundation type

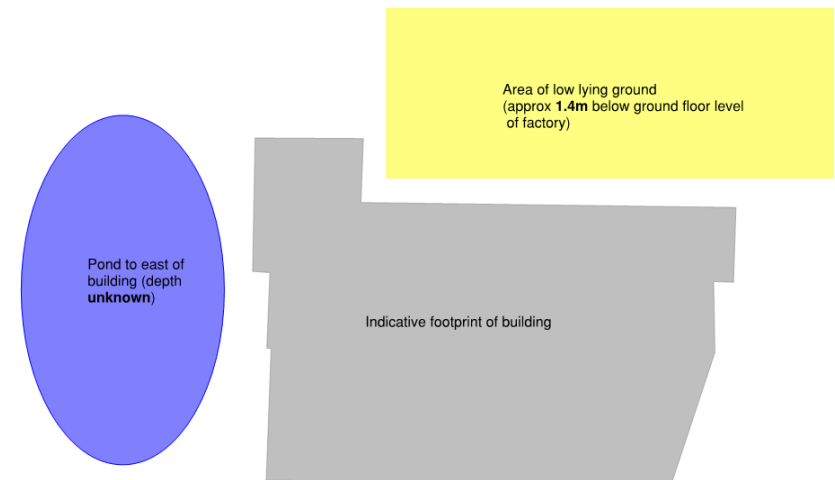
Soils report states that “*Shallow foundations including column footings may not be provided at building site for all borings*”, but on next page it states “*shallow foundations as isolated column footings*”, which suggests that shallow foundations **are** allowed. Engineer to ascertain ground conditions and advise whether the foundation types used for the building are suitable.



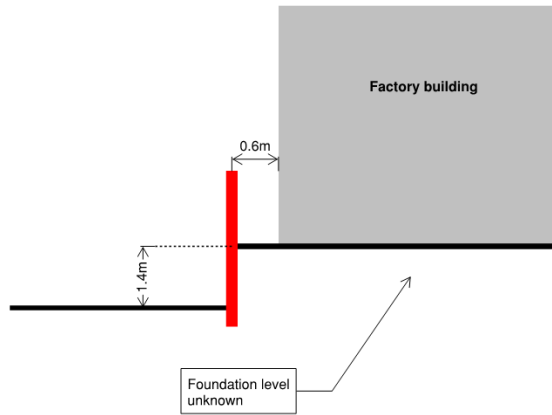
Foundations & surrounding ground conditions

Level differences around site

Around the building perimeter there are areas of lower ground e.g. in front of retaining wall and ponds close to building perimeter. These are not mentioned in the soils report. Engineer to confirm that these excavations and proximity to pond do not affect the building foundations. Suggest trial pits are dug to confirm foundation level.



Retaining Wall (1)



Retaining wall adjacent to building perimeter

No drawings available for single skin masonry wall along northern extent of building (approximate 0.6m from building perimeter). Wall is retaining approximately 1.4m earth on the building side.

Masonry wall appears to have deflected significantly but no movement evident in building façade or structure. Bamboo props appear to have been installed.

Engineer to confirm that foundation level of building is below retained soil and that building does not surcharge wall.

Retaining wall(1)



Retaining Wall (2)



Retaining wall adjacent to car park

No drawings available. It is understood this is supported by ground beams. Engineer to confirm how wall laterally restrains earth.

Column reinforcement was observed protruding above column. Factory owner to confirm whether additional structural modifications are planned to the wall.

Retaining wall(2)

Masonry pier stability

Masonry Pier Stability

Piers appear slender, engineer to check design under horizontal and vertical loading.



Masonry pier stability

High loading in area of double slab



At second floor (currently being fitted out) there is a 135mm thick ceiling slab at high level.

The floor slabs are subject to high loads due to selfweight of the walls, ceiling slab and storage on the ceiling.

Engineer to check load capacity of floor slab and confirm whether floor slab has sufficient capacity to store materials.



High loading in area of double slab

Large water tank planned for roof

Concrete water tank planned for roof

The building manager confirmed that a reinforced concrete water tank is to be placed on the roof once construction is complete. The location of this water tank is unclear. **It must not be built until the Detail Engineering Assessment is complete.**

The engineer is to check that the structure is capable of supporting the applied loading from the water tank.

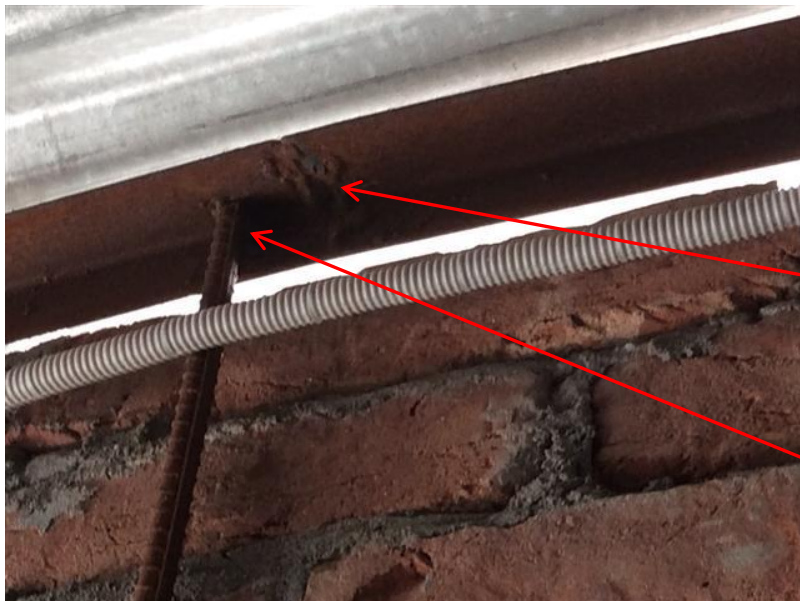
Non-engineered stair roof



Non-engineered roof to staircases.

Roof covering to staircase is formed of corrugated iron sheet supported by small steel angle. Lengths of angle appear to have been tack-welded together

Engineer to confirm that structure is suitable for design loadings.



Tack weld between lengths of angle

Roof tied down by welding angle to reinforcement and tying reinforcement to masonry wall.

Non-engineered stair roof

Non-structural issue

Edge protection during construction works

No edge protection when laying masonry façade at 5th floor level.

- Risk of masonry falling and injuring people at ground floor level, and risk of construction workers falling from this level.



Edge protection during construction

Priority Actions

Problems Observed

1. Highly-stressed columns
2. Building documentation does not match as-built structure – cantilevers, stair cores, external retaining walls.
3. Localised areas of high loading.
4. Uncertainty over advice on foundations in Soils Report.
5. Undocumented and lightweight roof structure above core.
6. Edge Protection to protect the public from falling construction materials, and to protect construction workers from falling from a height.

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Verify concrete strengths in columns	Factory Engineer to review design, loads and column stresses throughout building	Immediate - Now
2	Verify concrete strengths in columns	Verify insitu concrete stresses either by cores or existing cylinder strength data for cores from min. 4 no. columns.	Immediate - Now
3	Verify concrete strengths in columns	A Detail Engineering Assessment of Factory to be commenced; see attached Scope	Immediate - Now
4	Verify concrete strengths in columns	6th floor not to be constructed until Detail Engineering Assessment is complete.	Immediate - Now
5	Verify concrete strengths in columns	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	Verify concrete strengths in columns	Detail Engineering Assessment to be completed	6-weeks
7	Verify concrete strengths in columns	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. 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	Building documentation does not match as-built structure – cantilevers, stair cores, external retaining walls	Commence Detail Engineering Assessment as noted in Item 1	Immediate - Now
9	Building documentation does not match as-built structure – cantilevers, stair cores, external retaining walls	Building engineer to check, collect information and produce accurate and complete as-built documentation	6-weeks
10	Building documentation does not match as-built structure – cantilevers, stair cores, external retaining walls	Building engineer to perform an engineering assessment on the as-built structure and confirm that the structural elements can withstand the applied loading. Foundation assessment to include check on formation level and effects of adjacent retaining wall on building when removed	6-weeks
11	Building documentation does not match as-built structure – cantilevers, stair cores, external retaining walls	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor and column capacity	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
12	Localised areas of high loading in buildings	Extent of build-up loading in toilet and wash areas to be surveyed. Weight of water tanks on roof, and concrete ceiling slab at high-level 2nd floor, to be assessed. The capacity of floor & roof slabs to be assessed to confirm that the structure is designed to carry these loads.	6-weeks
13	Localised areas of high loading in buildings	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity. Loading plans to be put on each factory floor	6-months
14	Uncertainty over advice on foundations in Soils Report	Building engineer to ascertain ground conditions and advise if the foundations used for the building are suitable.	6-weeks
15	Uncertainty over advice on foundations in Soils Report	Carry out remedial work if required	6-months
16	Undocumented structure – lightweight steel structure and masonry piers	Building engineer to assess light weight roof structure and masonry piers and confirm its ability to withstand all horizontal and vertical loading. Particular attention should be given the masonry within stair cores.	6-weeks
17	Undocumented structure – lightweight steel structure and masonry piers	Carry out remedial work if required	6-months
18	Non-structural item - Edge protection at roof	Provide edge protection to protect members of the public from falling building material, and to protect construction workers from falling from a height	Immediate - Now