Reedisha Texstripe Ltd

Teknogpara, Salna, Gazipur, Dhaka
(24.013801, 90.382815)

21st March 2015

ACCORD on Fire and Building Safety in Bangladesh

ARUP

Observations

Building 1

Cracking in Beams and Brick Walls

Cracking in beams

Cracking in walls

Cracking observed in beams, brick wall infills, and between brick wall infill and structure

Observation

ACCORD on Fire and Building Safety in Bangladesh

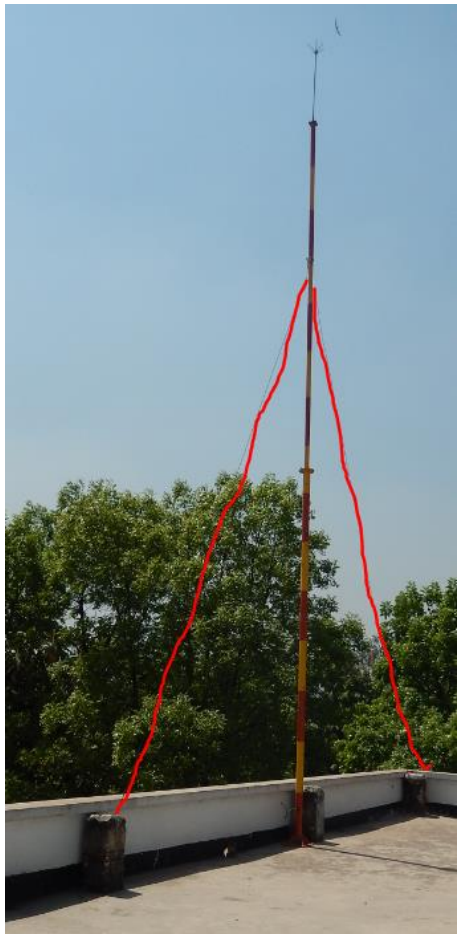
ARUP

Non engineered roof structure

Roof structure appears not adequate to resist high wind loads

Observation

Mast on roof not securely fastened



Mast on roof not securely fastened

Observation

Building 2

Lateral stability issues

Non-exhaustive list of lateral stability issues:

- No horizontal bracing in place.
- Trusses lack bottom chord restraint for wind uplift forces.
- Freestanding brickwall appears inadequate to give sufficient lateral restraint in out of plane direction.
- Insufficient information available to verify if steel column anchorage and foundation is able to provide lateral restraint by moment fixity at its base.

Lateral Stability Issues

Observation

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Non-engineered steel structures

L-purlins appear not adequate to resist high wind loads

Connection to brick wall appears not as engineer intended.
Bottom chord is not laterally restrained for wind uplift forces.

Roof trusses constructed from recycled steel

Holes in section from previous connections are weakening the steel capacity

Non-engineered steel roof trusses

Observation

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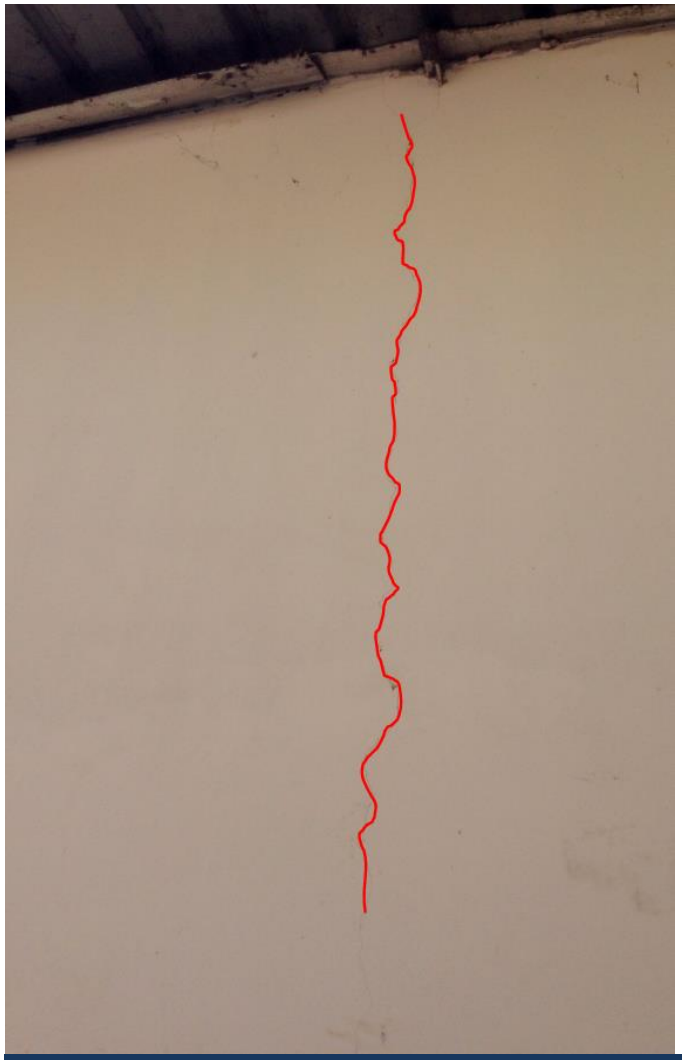
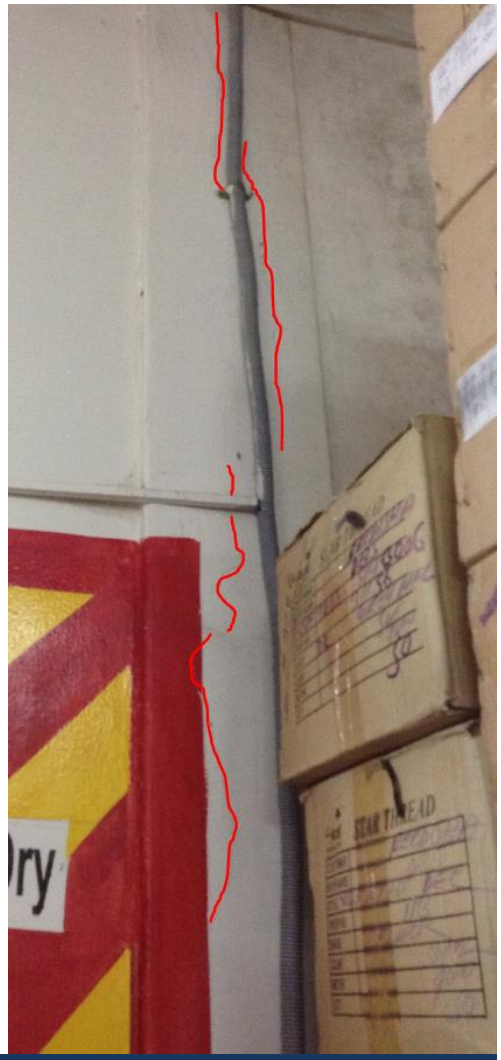
Stability of Perimeter Wall

Brick walls appear to relay on steel roof for out of plane stability.
Roof relays on brick wall for lateral stability.





Cracking noted in wall where steel columns are embedded.

Stability of freestanding perimeter brick wall

Observation

Robustness Issues of Sheds sharing the same support

Single support for trusses from both sides of wall

Robustness issues. Collapse of one shed (due to fire, instabilities under wind, etc) can cause the collapse of the other shed as well

Observation

Building 3

Lateral stability issues

Non-exhaustive list of lateral stability issues:

- No horizontal bracing in place.
- Trusses lack bottom chord restraint for wind uplift forces.

Lateral Stability Issues

Observation

Non-engineered steel structures

L-purlins appear not adequate to resist high wind loads

Non-engineered steel roof trusses

Observation

Stability of Perimeter Wall

Brick walls appear to relay on steel roof for out of plane stability.
Roof relays on brick wall for lateral stability.

Cracking noted in wall where steel columns are embedded.

Stability of freestanding perimeter wall

Observation

Water Damage in internal Wall

Internal wall with cantilevered cavity beam for rain water drainage

Steel truss support introduces eccentric load on wall

Cracking and water damage affecting support of steel truss

Water Damage in internal Wall

Observation

Deterioration of perimeter structure

Cracking in base of column/foundation caused by / or worsened by vegetation growth

Roots penetrated into cracks and worsened deterioration

Deterioration of perimeter structure

Observation

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Building Group 5

Unclear stability

No bracing in place for lateral stability in fire house

Observation

All Buildings

Drawing discrepancies

Evidence of low yield strength bars on roof

Non exhaustive List of Drawing discrepancies

Site Layout

- Clarify if the 50% open space requirement per regulations is still satisfied with the new shed under construction. Seek permission from authorities.

Building 1: 2-storey office building

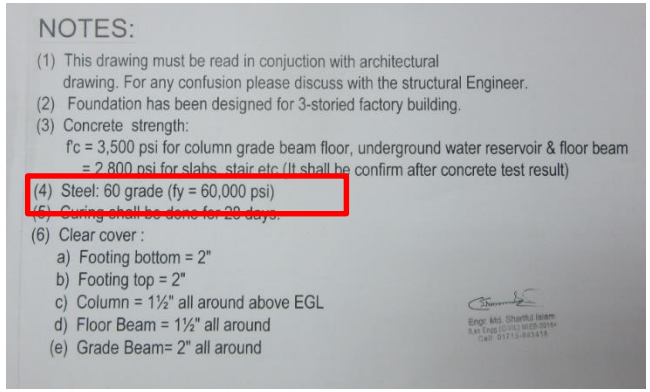
- Differences between the structural drawings and the as-built structure: concrete strength, rebar yield strength, column sizes

Building 2 and 3: single storey steel sheds

- Differences between the structural drawings and the as-built structure: in-built steel column, unclear concrete structure/brick wall

Building Group 4

- Abandoned structures used for dining and child care (3 storey house) is not documented



NOTES:

(1) This drawing must be read in conjuction with architectural drawing. For any confusion please discuss with the structural Engineer.
(2) Foundation has been designed for 3-storied factory building.
(3) Concrete strength:
f'c = 3,500 psi for column grade beam floor, underground water reservoir & floor beam
= 2,800 psi for slabs, stair etc (It shall be confirm after concrete test result)
(4) Steel: 60 grade (fy = 60,000 psi)
(5) Curing shall be done for 28 days.
(6) Clear cover :
a) Footing bottom = 2"
b) Footing top = 2"
c) Column = 1½" all around above EGL
d) Floor Beam = 1½" all around
(e) Grade Beam= 2" all around

GROUND COVERAGE AND MANDATORY GREEN CALCULATION :

NO	COVERAGE	REGULATIONS (As per FAR)	ALLOWABLE	PR
01	Ground Coverage Area (Maximum Limit)	60 % (Of Total Land Area) +50 % Of Open Space	8,980.96 sqm. 2,993.66 sqm. = 11,974.62 sqm.	
02	Mandatory open green (Minimum Limit)	50 % Of Open Space	2,993.66 sqm.	

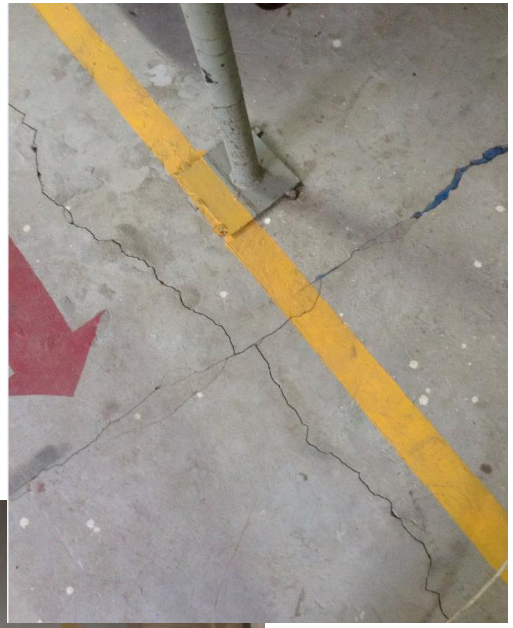
Drawing Discrepancies

Observation

Non structural observation

Cracking in Ground floor slab

Ground floor slab appears to be a thin layer of unreinforced lean cement mix on PE sheet.



Cracking in ground floor plates

Non-structural Observation

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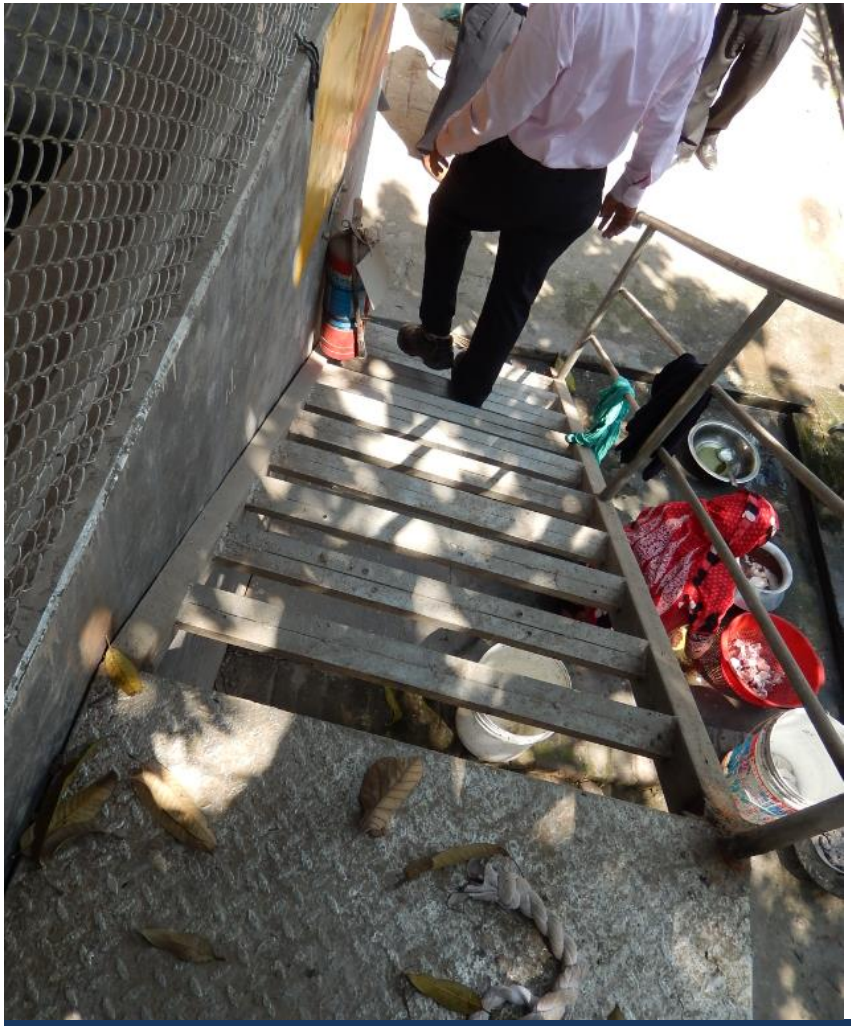
No fire protection for steel structures

No fire protection evident for steel structures

Non-structural Observation

Unsafe access stair to fire house



Unsafe access stair

Non-structural Observation

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Priority Actions

Problems Observed

Building 1

1. Cracking in Beams and Brick Walls
2. Non engineered roof structure
3. Mast on roof not securely fastened

Building 2 + 3

4. Lateral stability issues
5. Non-engineered steel structures
6. Stability of Perimeter Wall
7. Robustness Issues of Sheds sharing the same support

Building 3

8. Water Damage in internal Wall
9. Deterioration of perimeter structure

Building 5

10. Unclear stability

Non structural observation

- Cracking in Ground floor slab
- No fire protection for steel structures
- Unsafe access stair to fire house

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	Cracking in Beams and Brick Walls	Sections of plaster finish to beams to be removed to investigate if cracks penetrate the building structure	**6-weeks**
2	Cracking in Beams and Brick Walls	Building Engineer to carry out design check on beams to confirm that these cracks are non-structural.	**6-months**
3	Cracking in Beams and Brick Walls	Building Engineer to prepare Allowable Floor Loading Plans.	**6-months**
4	Non-engineered steel structures	Building engineer to check the steel structures on the roof of Building 1 and propose additional reinforcements and stability system, if required	**6-months**
5	Mast on roof not securely fastened	Building engineer to check the fixing of the mast on the roof of Building 1 and propose strengthening.	**6-months**
6	Lateral stability issues for steel frames for sheds	Building engineer to carry out a stability analysis and provide additional stability system if required.	**6-weeks**
7	Non-engineered steel structures	Building engineer to carry out engineering calculations and propose strengthening where required.	**6-weeks**
8	Non-engineered steel structures	Building engineer to provide as built drawings of steel structure, including description of lateral stability philosophy.	**6-weeks**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
9	Stability of Perimeter Wall	Building engineer to carry out engineering calculations of perimeter wall and propose strengthening where required.	**6-weeks**
10	Stability of Perimeter Wall	Building engineer to provide as built drawings of perimeter wall with embedded steel structure, including description of lateral stability philosophy.	**6-weeks**
11	Robustness Issues of Sheds sharing the same support	Building engineer to propose solution for separation of the structures.	**6-months**
12	Water Damage in internal Wall	Engineer to review load transfer from steel roof supports into wall through the eccentric loading of the drain water channel.	**6-weeks**
13	Water Damage in internal Wall	Propose strengthening or additional supports.	**6-weeks**
14	Water Damage in internal Wall	Repair cracks and water tightness to avoid further water ingress in the wall.	**6-months**
15	Water Damage in internal Wall	Inspect water damaged caused to date and propose appropriate repair if the damage caused compromises the structural integrity of the wall.	**6-months**
16	Deterioration of perimeter structure	Engineer to inspect all structural elements exposed to vegetation (columns, grade beams, foundations).	**6-months**
17	Deterioration of perimeter structure	Repair cracks and structure affected by environmental and vegetation growth	**6-months**
18	Deterioration of perimeter structure	Install protecting strip around perimeter of buildings to avoid vegetation grow and to protect structure from further deterioration.	**6-months**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
19	Unclear stability	Engineer to review lateral stability of fire house structure (in particular capacity of moment fixity of column bases) and propose additional vertical bracing if required.	**6-months**
20	Drawing Discrepancies	Building engineer to check, collect information and produce accurate and complete as-built documentation soonest.	**6-months**
21	Drawing Discrepancies	Verify material strength by site testing.	**6-months**
22	Drawing Discrepancies	Document clearly between RC structure and brick structure	**6-months**
23	Drawing Discrepancies	Seek building permit for the new construction.	**6-months**