

Knit Plus Limited (Extension)

Plot-2036, Mouchak, Kaliakair, Gazipur

(24.026068, 90.298932)

6 October 2024



1. Building Information:

Extension Building- Production (B+G+7)

RMS Room (G)

Boiler Room (G)

2. Observation & CAP

Observation 1: Inconsistencies in the design report. (Extension Building-Production)

For Beam:

- 8.3.10.4 Beams**
a) The positive moment strength at the face of the joint shall not be less than one-third the negative moment strength provided at that face. Neither the negative nor positive moment strength at any section along the length of the member shall be less than one-fifth of the maximum moment strength provided at the face of either joint.
b) At both ends of the member, stirrups shall be provided over lengths equal to twice the member depth measured from the face of the supporting member toward midspan. The first stirrup shall be located not more than 50 mm from the face of the supporting member. Maximum stirrup spacing shall not exceed (a) $d/4$, (b) 8 times the diameter of the smallest longitudinal bar enclosed, (c) 24 times the diameter of the stirrup bar, and (d) 300 mm.
c) Stirrups shall be placed at not more than $d/2$ throughout the length of the member.

GB-01				GB-04			
Negative rebar at end	1.75 sqin			Negative rebar at end	1.11 sqin		
Positive rebar at end	2.09 sqin			Positive rebar at end	1.11 sqin		
Maximum rebar at end	2.09 sqin			Maximum rebar at end	1.11 sqin		
Minimum Rebar Along Length	1.11 sqin			Minimum Rebar Along Length	1.11 sqin		
1/3 of neg reinf	0.58 sqin	OK		1/3 of neg reinf	0.37 sqin	OK	
1/5 of max reinf	0.418 sqin	OK		1/5 of max reinf	0.222 sqin	OK	
d	18.3 in			d	15.5 in		
d/4	4.625 in			d/4	3.875 in		
Dia of smallest long bar	16 mm			Dia of smallest long bar	16 mm		
8"dia of smallest long bar	5.12 in			8"dia of smallest long bar	5.12 in		
Dia of stirrup bar	18 mm			Dia of stirrup bar	18 mm		
24"dia of stirrup bar	9.6 in			24"dia of stirrup bar	9.6 in		
12 in				12 in			
Minimum	4.625 in			Minimum	3.875 in		
Provided	3 in	Marginally OK		Provided	4 in	Marginally OK	
Depth of beam	23 in			Depth of beam	34 in		
2"depth of beam	42 in			2"depth of beam	36 in		
Length of Hoop zone	48 in	OK		Length of Hoop zone	48 in	OK	
Maximum stirrup spacing	7 in	OK		Maximum stirrup spacing	7 in	OK	
d/2	9.25 in			d/2	7.75 in		

B-01				B-02			
Negative rebar at end	2.09 sqin			Negative rebar at end	2.45 sqin		
Positive rebar at end	2.09 sqin			Positive rebar at end	2.09 sqin		
Maximum rebar at end	2.09 sqin			Maximum rebar at end	2.45 sqin		
Minimum Rebar Along Length	1.47 sqin			Minimum Rebar Along Length	1.47 sqin		
1/3 of neg reinf	0.70 sqin	OK		1/3 of neg reinf	0.82 sqin	OK	
1/5 of max reinf	0.418 sqin	OK		1/5 of max reinf	0.49 sqin	OK	
d	19.5 in			d	19.5 in		
d/4	4.875 in			d/4	4.875 in		
Dia of smallest long bar	18 mm			Dia of smallest long bar	18 mm		
8"dia of smallest long bar	5.12 in			8"dia of smallest long bar	5.12 in		
Dia of stirrup bar	18 mm			Dia of stirrup bar	18 mm		
24"dia of stirrup bar	9.6 in			24"dia of stirrup bar	9.6 in		
12 in				12 in			
Minimum	4.875 in			Minimum	4.875 in		
Provided	4 in	OK		Provided	5 in	Marginally OK	
Depth of beam	21 in			Depth of beam	21 in		
2"depth of beam	42 in			2"depth of beam	42 in		
Length of Hoop zone	48 in	OK		Length of Hoop zone	48 in	OK	
Maximum stirrup spacing	7 in	OK		Maximum stirrup spacing	7 in	OK	
d/2	9.75 in			d/2	9.75 in		

2.3 MATERIAL PROPERTY

Concrete design strength has been confirmed by evaluating the core test report. As per test report, the following material properties has been used:

- Yield strength of Rebar, f_y = 72,500 lb/in²
- Compressive strength of column, wall, foundation, f'_c = 6,067 lb/in²
- Compressive strength of Beam, slab, f'_c = 4,834 lb/in²
- Young's modulus of concrete, E_c = 57,000√ f'_c

Evaluation of Core test result for Column:

Sample No	Core test result	Diameter of Core (inch)	Diameter Effect	Damage Effect	Modified Core test result	Average	kc	Number of sample	Standard deviation	Coefficient of variation	Equivalent Concrete strength according to ACI 562 sec. 6.4.3
1	5610	2.717	1.0385	1.06	6175.57						
2	6630	2.717	1.0385	1.06	7298.40						
3	6450	2.717	1.0385	1.06	7100.25						
4	7800	2.717	1.0385	1.06	8586.35						
5	9050	2.717	1.0385	1.06	9962.37						
						7824.59	1.2	5	1472.34	0.19	6067.23

Evaluation of Core test result for Column:

Sample No	Core test result	Diameter of Core (inch)	Diameter Effect	Damage Effect	Modified Core test result	Average	kc	Number of sample	Standard deviation	Coefficient of variation	Equivalent Concrete strength according to ACI 562 sec. 6.4.3
1	5320	2.717	1.0385	1.06	5856.33						
2	5350	2.717	1.0385	1.06	5889.36						
3	4450	2.717	1.0385	1.06	4898.62						
4	7060	2.717	1.0385	1.06	7771.75						
5	5770	2.717	1.0385	1.06	6351.70						
						6153.55	1.2	5	1047.71	0.17	4834.69

IMRF Calculation

Concrete strength evaluation

Description: Stirrup spacing requirements are not satisfied for the Intermediate Moment Resisting Frame (IMRF) system.

The equivalent concrete strength from the core test is not verified with the actual design strength of the building.

Building engineer is required to confirm the seismic force resistance system of the building.

Building engineer is also required to collect the construction drawing and verify the concrete strength based on the design strength & in-situ concrete core strength.

Observation 2: Hairline cracks on the roof beams and slab/ toilet false slab. (Extension Building-Production)	
	
Crack on beams	
	
Crack on the false slab	Crack on the slab
Description: Hairline cracks were found on the beams, slab and false slab of toilet. Building engineer is required to investigate the cracks and suggest suitable remedial works.	
Observation-3: Anchorage of nonstructural elements. (Extension Building-Production).	
	
Description: Non-structural elements found unanchored/braced. The building engineer is required to anchor/brace all nonstructural elements within the factory	

Observation-4: Unrestraint brick wall (Extension Building-Production).

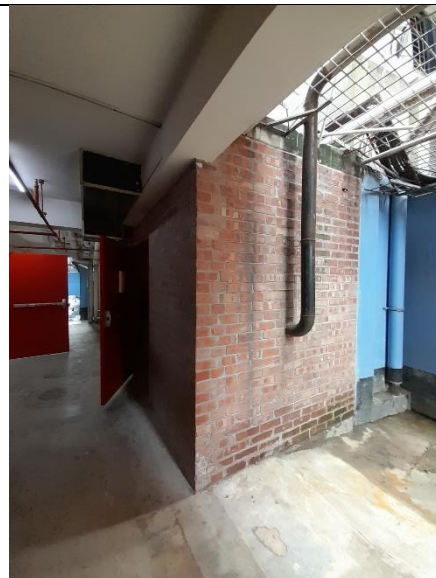


Description: Unrestrained brick wall of 3.5 m in height was observed on the 7th floor. Building engineer is required to check the stability and provide a head restraint on the top of the brick wall.

Observation 5: Lack of as-built drawing. (RMS Room & BOILER Room)



Boiler Room



RMS Room

Description: As-built drawings were not available for the structures. Building engineer is required to prepare a full set of the as-built drawings.

Observation-6: Safety check against vertical and lateral loading. (BOILER Room)



Description: No design documents were available on site. Building engineer is required to prepare a safety check report of the structure for gravity and lateral loading according to Accord Building Standards.

3. Action Plan

Item No.	Observation	Action Plan	Timeline
1.	Inconsistencies in the design report. (Extension Building-Production)	Building engineer is required to confirm the seismic force resistance system of the building.	within 6 weeks
2.		Building engineer is required to collect the construction drawing and verify the concrete strength based on the design strength & in-situ concrete core strength.	within 6 weeks
3.		Carry out remedial works where required.	within 6 months
4.	Hairline Crack on the roof beams and slab/ toilet false slab. (Extension Building-Production)	Building engineer is required to investigate the cracks and suggest suitable remedial works.	within 6 weeks
5.		Carry out remedial works where necessary.	within 6 weeks
6.	Anchorage of nonstructural elements. (Extension Building- Production).	The building engineer is required to anchor/brace all nonstructural elements within the factory.	within 6 weeks
7.	Unrestraint brick wall (Extension Building-Production).	Building engineer is required to check the stability and provide a head restraint on the top of the brick wall.	within 6 weeks
8.	Lack of as-built drawing. (RMS Room & BOILER Room)	Building engineer is required to prepare the full set of as-built drawings.	within 6 weeks
9.	Safety check against vertical and lateral loading. (BOILER Room)	Building engineer is required to prepare a safety check report of the structure for gravity and lateral loading according to Accord Building Standards.	within 6 weeks
10.		Carry out remedial works where necessary.	within 6 months