

KiDO BD Co., Limited.

Plot-117, 125 & 126, Adamjee EPZ, Siddhirganj, Narayanganj

(23.673550N, 90.527450E)

2 January 2024

Issue 01

06 March 2024



1. Building Information

Main Building: This structure consists of three parts. One part is a four-storied steel building, another part is a single-storied shed, and another part is a three-storied reinforced concrete (RC) structure.

Dining & Canteen Shed: This is a single-storied steel shed with a mezzanine.

Utility & Wastage Shed: This is a single-storied steel shed (206 sqm. Area) with a partially three-storied RC structure (68 sqm. Area).

Security & Fire Control: This is a single-storied RC structure.

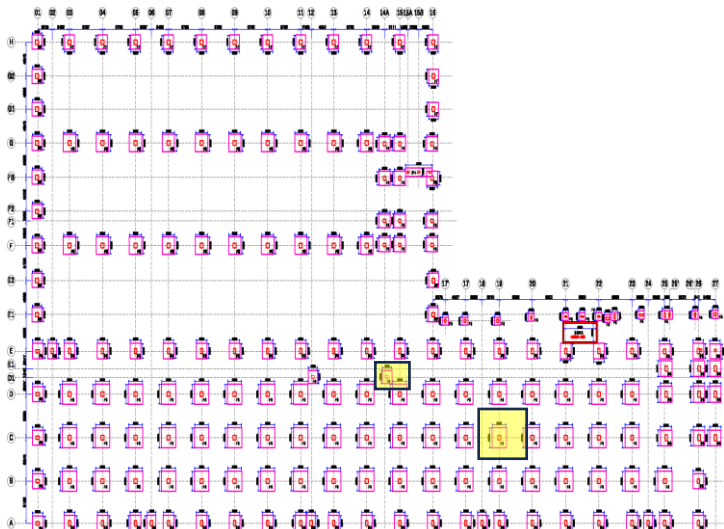
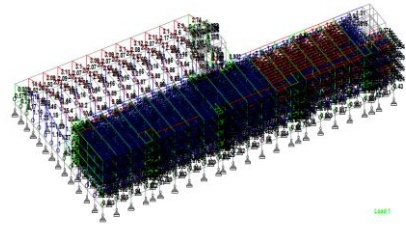
RMS & Chemical Store: This is a single-storied RC structure with a partial roof shed.

Driver Shed: This is a single-storied steel shed.

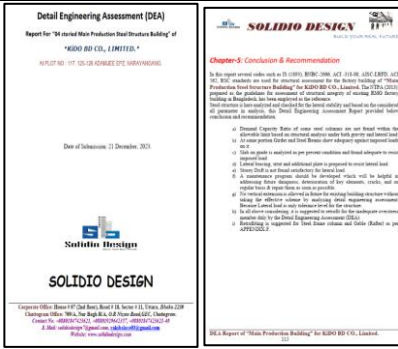
Car Parking Shed: This is a single-storied steel shed.

Motorcycle Parking Shed: This is a single-storied steel shed.

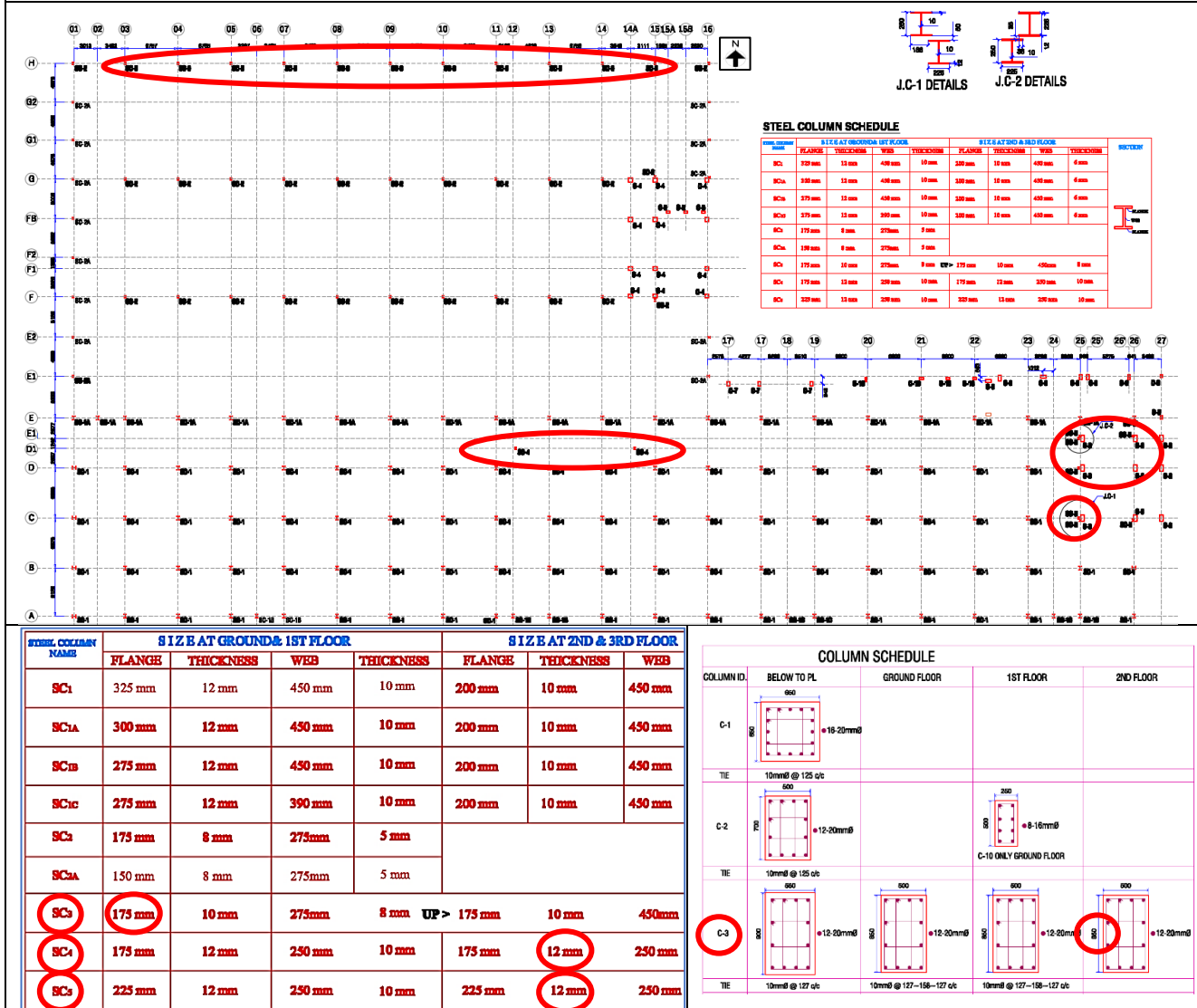
2. Observations

Main Building	
Observation-1: Stress in the column & foundation above normal design limit (Main Building).	
	
Column Footing Layout	Floor Loads
SOLIDIO DESIGN BUILD YOUR REAL FUTURE To determine concrete strength, Cylinder sample are tested in the laboratory of BUET for determining concrete compressive strength. All the structural members were constructed with these slabs. Detail results have been shown in Appendix-D TENSILE STRENGTH TEST: To determine tensile strength, other sample are tested in the laboratory of BUET for determining other tensile strength of Reinforced concrete. ANALYSIS OF STRUCTURE: Based on the data provided & the structure has been analyzed by FEM STADDO Pro V16. The results of the analysis have been described in another part of this report. Summary: Based on the considered all parameter in analysis, this Engineering Assessment Report provided below conclusion and recommendation: 1) Demand Capacity Ratio of some steel columns are not found within the allowable limit based on structural analysis under both gravity and lateral load. 2) At some portion Girder and Steel Beams show adequacy against imposed loads on it. 3) Slab on grade is analyzed as per present condition and found adequate to resist imposed load. 4) Lateral bracing, strut and additional plate is proposed to resist lateral load. 5) Storey Drift is not found satisfactory for lateral load. 6) Detail Engineering Assessment is required. 7) Retrofitting is suggested as per Appendix-F.	CHAPTER-4: Output & Discussion 4.1 Steel frame Graphical output:  Fig-4.1: 3D Rendered DCR of Main Production Building steel structure output View (DCR<1.05, Satisfactory)
Description: Columns are stressed above normal design limits considering both gravity and lateral loading. Also, the cursory calculation indicates that footings are stressed above the normal design limit at the marked locations considering floor live load of 3 kPa for the typical floors, and 1.5 kPa for the roof. The building engineer is required to review design loads and column & foundation stresses. Also, produce and actively manage load management plans.	

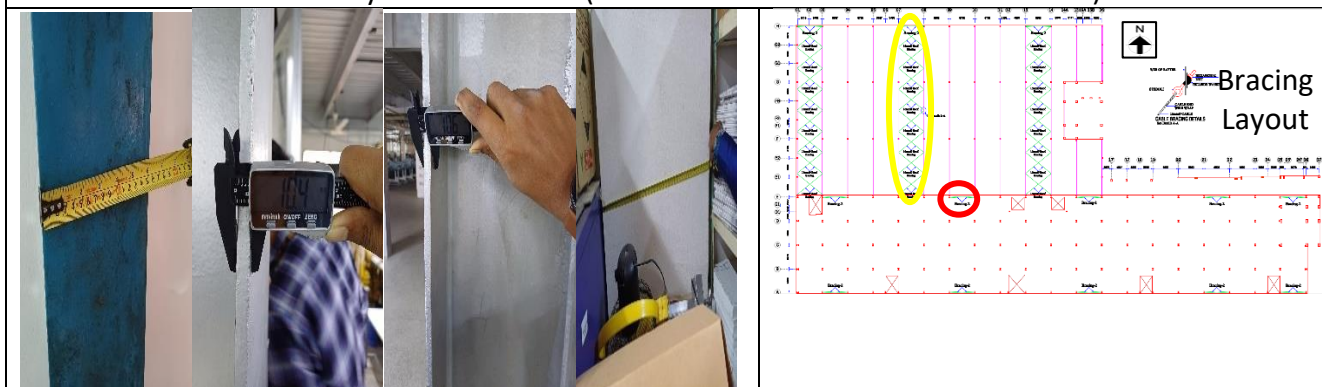
Observation 2: Lack of information in the design report (Main Building).

		
Lack of information	Steel Connections	Additional Load
Description: In the provided design report, the RC frame analysis and demand capacity ratio, foundation adequacy checks were not incorporated. Also, steel member connection adequacy further analysis and overstressed member recommendations were not provided in the design report. Loading from water tanks and screeding are not considered in the design report. The building engineer is required to update the design report in compliance with BNBC.		

Observation 3: Mismatch between the provided drawing and on-site condition (Main Building).



Column Layout & Schedule (mismatch in red marked area columns)



Description: As per the provided drawing, steel column SC3, SC4, SC5 sizes are W275~450 X F175(10), W250 X F175(12), W250 X F225(12) respectively and RC column C3 size is 500X850. During the inspection, RC column C3 size was observed as 500X700. As well as steel column SC3 flange width (150mm), SC4 & SC5 flange thickness (10mm) mismatches were observed apart from the provided drawing. Also bracing layout mismatch and missing were observed (yellow marked bracing location mismatch and red marked bracing missing).

A building engineer is required to survey the whole structure and prepare the as-built drawing reflecting the on-site condition as well as update the design report.

Observation-4: Lack of lateral load transfer media for the shed roof (Main Building).



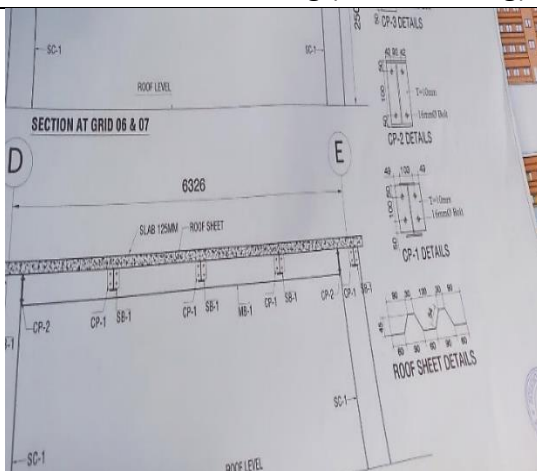
Description: The shed has portal framing action in the North-South direction. However, the roof shed does not have a lateral load transfer and load-resisting system along the East-West direction. Building engineer is required to check the lateral stability of the structure and suggest proper remedial actions.

Observation-5: Nonstructural elements found not anchored/braced (Main Building).



Description: Nonstructural elements found not anchored/braced. The building engineer is required to brace/anchor all nonstructural elements including storage racks within the factory.

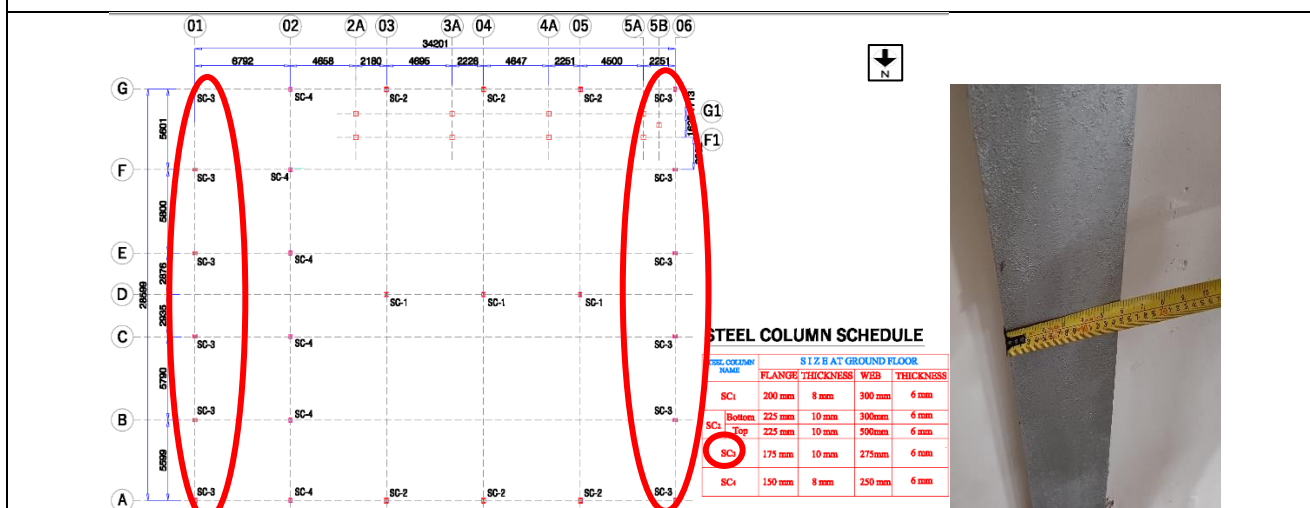
Observation-6: Bolt Missing (Main Building).



Description: During the inspection, a bolt missing was observed in the rooftop lift machine room deck beam and sub-beam. The building engineer is required to Identify all the required locations and install missing bolts.

Dining & Canteen Shed

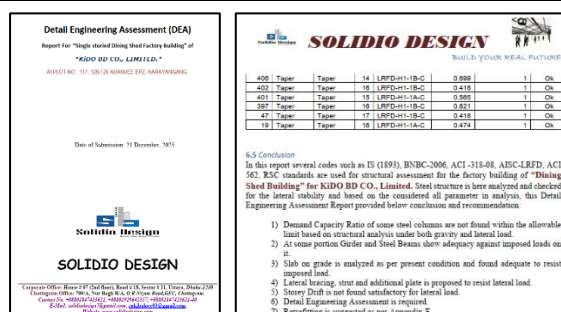
Observation-7: Mismatch within the provided drawing & on-site condition (Dining & Canteen Shed).



Column Layout & Schedule (mismatch in red marked area columns)

Description: As per the provided drawing, the steel column SC3 size is W275 X F175(10). During the inspection, SC3 size was observed as W275 X F150(10), flange width mismatch was observed apart from the provided drawing. A building engineer is required to survey the whole structure and prepare the as-built drawing reflecting the on-site condition as well as update the design report.

Observation-8: Lack of information in the design report (Dining & Canteen Shed).



Description: In the provided design report RC frame analysis and demand capacity ratio, foundation adequacy checks were not incorporated. Also, steel member connection adequacy further analysis and overstressed member recommendations were not provided in the design report. The building engineer is required to update the design report in compliance with BNBC.

Observation-9: Lack of lateral load transfer media for the roof shed. (Dining & Canteen Shed).



Description: The shed has portal framing action in the North-South direction. However, the roof shed does not have lateral load transfer and load-resisting system along the East-West direction. Building engineer is required to check the lateral stability of the structure and suggest proper remedial actions.

Observation-10: Loose cable bracing (Dining & Canteen Shed).



Description: During the inspection, loose cable bracing was observed at several locations as sagged. The building engineer is required to Identify all the required locations and tighten the loose cable bracings.

Observation-11: Cracks found on the RC column of the ramp (Dining & Canteen Shed).



Description: During the inspection, cracks were found on the RC column of the ramp at multiple locations. The building engineer is required to investigate the cracks including the reason of cracks, extend of cracks and suggest proper crack repair methodology. Factory is required to follow the recommendation of the investigation report for remedial works of cracks.

Observation-12: Sign of warping and tilting of steel column (Dining & Canteen Shed).

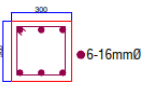
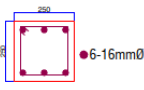
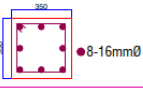
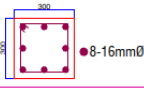


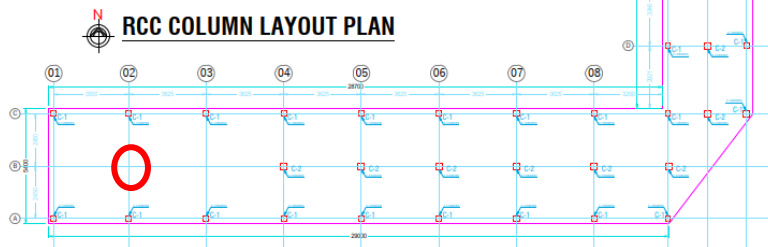
Description: During the inspection, a steel column was observed with the sign rapping and tilting. The building engineer is required to recommend a suitable repair methodology. And the factory is required to follow the recommendation.

Utility & Wastage Shed

Observation-13: Mismatch & lack of information between the provided drawing and on-site condition.

(Utility & Wastage Shed)

COLUMN SCHEDULE		
COLUMN ID.	GROUND FLOOR	1ST FLOOR TO TOP
C-1	 6-16mmØ	 6-16mmØ
TIE	10mmØ @ 100 c/c	10mmØ @ 100~150~100c/c
C-2	 8-16mmØ	 8-16mmØ
TIE	10mmØ @ 100 c/c	10mmØ @ 100~150~100c/c



Description: During the inspection, additional columns and beams were observed apart from the drawing. Also, the foundation and retaining wall details were not incorporated in the provided drawing. A building engineer is required to survey the whole structure and prepare the as-built drawing reflecting the on-site condition.

Observation-14: Lack of design documents (Utility & Wastage Shed).



Description: As per BNBC (part 6), every building or structure designed shall have its design documents prepared following the provision of Section 1.9.1. The design document shall include a design report, and a set of structural drawings, which shall be prepared in compliance with section 1.9.1.1 & section 1.9.1.2 of BNBC (part 6).

At the time of inspection, no design report was available for the mentioned structure. The building engineer is required to prepare a set of design documents in compliance with BNBC.

Ancillary Structures

Observation-15: Apparently inadequate connections (Driver Shed, Parking Shed, RMS & Chemical Store, & Wastage Shed).



Description: Apparently inadequate connections were observed at the lightweight roof of the single-storied Sheds. The building engineer is required to check the connection adequacy of the lightweight roof against the uplift pressure of wind and suggest suitable remedial methods.

Observation-16: Lack of as-built drawings (Driver Shed & Parking Shed)



Description: As-built drawings of the ancillary structures were not available on-site at the time of inspection. The building engineer is required to prepare a full set of as-built drawings reflecting the on-site condition and submit it to RSC for review.

3. Action Plan

Observation	Action Plan	Timeline
Main Building		
Stress in the column & foundation above normal design limit (Main Building).	The building engineer is required to review the design and columns & foundation stresses.	within 6 weeks
	Produce and actively manage load management plans.	within 6 weeks
	Implement remediation work if required.	within 6 months
	Implement a load management plan.	within 6 months
Lack of information in the design report (Main Building)	Building engineer is required to update the design documents in compliance with BNBC.	within 6 weeks
	Complete implementation of remedial works if required.	within 6 months
Mismatch between the provided drawing & on-site condition (Main Building).	The building engineer is required to survey the whole structure and prepare the as-built drawing reflecting the on-site condition.	within 6 weeks
Lack of lateral load transfer media for the shed roof (Main Building)	Building engineer is required to check the lateral stability of the structure and suggest proper remedial actions.	within 6 weeks
	Complete implementation of remedial works if required.	within 6 months
Nonstructural elements found not anchored/braced (Main Building)	The building engineer is required to brace/anchor all nonstructural elements including storage racks within the factory.	within 6 weeks
Bolt Missing (Main Building)	The building engineer is required to Identify all the required locations and install missing bolts.	within 6 weeks

Observation	Action Plan	Timeline
Dining & Canteen Shed		
Mismatch between the provided drawing & on-site condition (Dining & Canteen Shed).	The building engineer is required to survey the whole structure and prepare the as-built drawing reflecting the on-site condition.	within 6 weeks
Lack of information in the design report (Dining & Canteen Shed)	Building engineer is required to update the design documents in compliance with BNBC.	within 6 weeks
	Complete implementation of remedial works if required.	within 6 months
Lack of lateral load transfer media for the shed roof (Dining & Canteen Shed)	Building engineer is required to check the lateral stability of the structure and suggest proper remedial actions.	within 6 weeks
	Complete implementation of remedial works if required.	within 6 months
Loose cable bracing (Dining & Canteen Shed)	The building engineer is required to Identify all the required locations and tighten the loose cable bracings.	within 6 weeks
Cracks found on RC column of the ramp (Dining & Canteen Shed)	The building engineer is required to investigate the cracks including the reason of cracks, extend of cracks and suggest proper crack repair methodology. Factory is required to follow the recommendation of the investigation report for remedial works of cracks.	within 6 weeks
Sign of warping and tilting of steel column (Dining & Canteen Shed)	The building engineer is required to recommend a suitable repair methodology. And the factory is required to follow the recommendation.	within 6 weeks

Observation	Action Plan	Timeline
Utility & Wastage Shed		
Mismatch & lack of information between the provided drawing and the on-site condition. (Utility & Wastage Shed)	The building engineer is required to survey the whole structure and prepare the as-built drawing reflecting the on-site condition.	within 6 weeks
Lack of design documents (Utility & Wastage Shed).	The building engineer is required to prepare a set of design documents in compliance with BNBC.	within 6 weeks
	Complete implementation of remedial works if required.	within 6 months
Ancillary Structures		
Apparently inadequate connections (Driver Shed, Parking Shed, RMS & Chemical Store, & Wastage Shed)	Building engineer is required to check the connection of the steel roof for the uplift pressure of the wind.	within 6 weeks
	Complete implementation of remedial works if required.	within 6 months
Lack of as-built drawing. (Driver Shed and Parking Shed)	The building engineer is required to prepare a full set of as-built drawings reflecting the on-site condition in compliance with section 1.9.1.2, part-6 of BNBC, and submit it to RSC for review.	within 6 weeks