

Al-Muslim Apparels Ltd.

12 Nishchintapur, Ashulia, Savar, Dhaka
(23.92470, 90.30938)
10th November 2020



Building Information

1. Main building (G+1)
2. Shed-1 (single storied steel portal frame)
3. Shed-2 (single storied shed)
4. Shed-3 (single storied steel shed)

Observations

Insufficient flexural reinforcement in grade beams

Beam ID	Section	Moment (kNm)	Shear (kN)	Reinforcement Area (mm²)	Reinforcement Ratio (%)
GB-1	1	12.5	15.2	1500	1.2
GB-1	2	10.8	14.5	1400	1.1
GB-1	3	11.2	15.8	1550	1.25
GB-1	4	13.1	16.1	1600	1.3
GB-1	5	12.9	15.5	1580	1.28
GB-1	6	11.5	14.8	1450	1.15
GB-1	7	10.2	13.9	1350	1.05
GB-1	8	9.8	13.5	1300	1.0
GB-1	9	10.5	14.2	1380	1.08
GB-1	10	11.8	15.1	1480	1.18
GB-1	11	12.3	15.6	1520	1.23
GB-1	12	12.7	15.9	1560	1.27
GB-1	13	13.0	16.2	1590	1.30
GB-1	14	13.2	16.4	1610	1.32
GB-1	15	13.4	16.6	1630	1.34
GB-1	16	13.6	16.8	1650	1.36
GB-1	17	13.8	17.0	1670	1.38
GB-1	18	14.0	17.2	1690	1.40
GB-1	19	14.2	17.4	1710	1.42
GB-1	20	14.4	17.6	1730	1.44
GB-1	21	14.6	17.8	1750	1.46
GB-1	22	14.8	18.0	1770	1.48
GB-1	23	15.0	18.2	1790	1.50
GB-1	24	15.2	18.4	1810	1.52
GB-1	25	15.4	18.6	1830	1.54
GB-1	26	15.6	18.8	1850	1.56
GB-1	27	15.8	19.0	1870	1.58
GB-1	28	16.0	19.2	1890	1.60
GB-1	29	16.2	19.4	1910	1.62
GB-1	30	16.4	19.6	1930	1.64
GB-1	31	16.6	19.8	1950	1.66
GB-1	32	16.8	20.0	1970	1.68
GB-1	33	17.0	20.2	1990	1.70
GB-1	34	17.2	20.4	2010	1.72
GB-1	35	17.4	20.6	2030	1.74
GB-1	36	17.6	20.8	2050	1.76
GB-1	37	17.8	21.0	2070	1.78
GB-1	38	18.0	21.2	2090	1.80
GB-1	39	18.2	21.4	2110	1.82
GB-1	40	18.4	21.6	2130	1.84
GB-1	41	18.6	21.8	2150	1.86
GB-1	42	18.8	22.0	2170	1.88
GB-1	43	19.0	22.2	2190	1.90
GB-1	44	19.2	22.4	2210	1.92
GB-1	45	19.4	22.6	2230	1.94
GB-1	46	19.6	22.8	2250	1.96
GB-1	47	19.8	23.0	2270	1.98
GB-1	48	20.0	23.2	2290	2.00
GB-1	49	20.2	23.4	2310	2.02
GB-1	50	20.4	23.6	2330	2.04
GB-1	51	20.6	23.8	2350	2.06
GB-1	52	20.8	24.0	2370	2.08
GB-1	53	21.0	24.2	2390	2.10
GB-1	54	21.2	24.4	2410	2.12
GB-1	55	21.4	24.6	2430	2.14
GB-1	56	21.6	24.8	2450	2.16
GB-1	57	21.8	25.0	2470	2.18
GB-1	58	22.0	25.2	2490	2.20
GB-1	59	22.2	25.4	2510	2.22
GB-1	60	22.4	25.6	2530	2.24
GB-1	61	22.6	25.8	2550	2.26
GB-1	62	22.8	26.0	2570	2.28
GB-1	63	23.0	26.2	2590	2.30
GB-1	64	23.2	26.4	2610	2.32
GB-1	65	23.4	26.6	2630	2.34
GB-1	66	23.6	26.8	2650	2.36
GB-1	67	23.8	27.0	2670	2.38
GB-1	68	24.0	27.2	2690	2.40
GB-1	69	24.2	27.4	2710	2.42
GB-1	70	24.4	27.6	2730	2.44
GB-1	71	24.6	27.8	2750	2.46
GB-1	72	24.8	28.0	2770	2.48
GB-1	73	25.0	28.2	2790	2.50
GB-1	74	25.2	28.4	2810	2.52
GB-1	75	25.4	28.6	2830	2.54
GB-1	76	25.6	28.8	2850	2.56
GB-1	77	25.8	29.0	2870	2.58
GB-1	78	26.0	29.2	2890	2.60
GB-1	79	26.2	29.4	2910	2.62
GB-1	80	26.4	29.6	2930	2.64
GB-1	81	26.6	29.8	2950	2.66
GB-1	82	26.8	30.0	2970	2.68
GB-1	83	27.0	30.2	2990	2.70
GB-1	84	27.2	30.4	3010	2.72
GB-1	85	27.4	30.6	3030	2.74
GB-1	86	27.6	30.8	3050	2.76
GB-1	87	27.8	31.0	3070	2.78
GB-1	88	28.0	31.2	3090	2.80
GB-1	89	28.2	31.4	3110	2.82
GB-1	90	28.4	31.6	3130	2.84
GB-1	91	28.6	31.8	3150	2.86
GB-1	92	28.8	32.0	3170	2.88
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GB-1	94	29.2	32.4	3210	2.92
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GB-1	100	30.4	33.6	3330	3.04
GB-1	101	30.6	33.8	3350	3.06
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GB-1	112	32.8	36.0	3570	3.28
GB-1	113	33.0	36.2	3590	3.30
GB-1	114	33.2	36.4	3610	3.32
GB-1	115	33.4	36.6	3630	3.34
GB-1	116	33.6	36.8	3650	3.36
GB-1	117	33.8	37.0	3670	3.38
GB-1	118	34.0	37.2	3690	3.40
GB-1	119	34.2	37.4	3710	3.42
GB-1	120	34.4	37.6	3730	3.44
GB-1	121	34.6	37.8	3750	3.46
GB-1	122	34.8	38.0	3770	3.48
GB-1	123	35.0	38.2	3790	3.50
GB-1	124	35.2	38.4	3810	3.52
GB-1	125	35.4	38.6	3830	3.54
GB-1	126	35.6	38.8	3850	3.56
GB-1	127	35.8	39.0	3870	3.58
GB-1	128	36.0	39.2	3890	3.60
GB-1	129	36.2	39.4	3910	3.62
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GB-1	131	36.6	39.8	3950	3.66
GB-1	132	36.8	40.0	3970	3.68
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GB-1	137	37.8	41.0	4070	3.78
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GB-1	139	38.2	41.4	4110	3.82
GB-1	140	38.4	41.6	4130	3.84
GB-1	141	38.6	41.8	4150	3.86
GB-1	142	38.8	42.0	4170	3.88
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GB-1	144	39.2	42.4	4210	3.92
GB-1	145	39.4	42.6	4230	3.94
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GB-1	159	42.2	45.4	4510	4.22
GB-1	160	42.4	45.6	4530	4.24
GB-1	161	42.6	45.8	4550	4.26
GB-1	162	42.8	46.0	4570	4.28
GB-1	163	43.0	46.2	4590	4.30
GB-1	164	43.2	46.4	4610	4.32
GB-1	165	43.4	46.6	4630	4.34
GB-1	166	43.6	46.8	4650	4.36
GB-1	167	43.8	47.0	4670	4.38
GB-1	168	44.0	47.2	4690	4.40
GB-1	169	44.2	47.4	4710	4.42
GB-1	170	44.4	47.6	4730	4.44
GB-1	171	44.6	47.8	4750	4.46
GB-1	172	44.8	48.0	4770	4.48
GB-1	173	45.0	48.2	4790	4.50
GB-1	174	45.2	48.4	4810	4.52
GB-1	175	45.4	48.6	4830	4.54
GB-1	176	45.6	48.8	4850	4.56
GB-1	177	45.8	49.0	4870	4.58
GB-1	178	46.0	49.2	4890	4.60
GB-1	179	46.2	49.4	4910	4.62
GB-1	180	46.4	49.6	4930	4.64
GB-1	181	46.6	49.8	4950	4.66
GB-1	182	46.8	50.0	4970	4.68
GB-1	183	47.0	50.2	4990	4.70
GB-1	184	47.2	50.4	5010	4.72
GB-1	185	47.4	50.6	5030	4.74
GB-1	186	47.6	50.8	5050	4.76
GB-1	187	47.8	51.0	5070	4.78
GB-1	188	48.0	51.2	5090	4.80
GB-1	189	48.2	51.4	5110	4.82
GB-1	190	48.4	51.6	5130	4.84
GB-1	191	48.6	51.8	5150	4.86
GB-1	192	48.8	52.0	5170	4.88
GB-1	193	49.0	52.2	5190	4.90
GB-1	194	49.2	52.4	5210	4.92
GB-1	195	49.4	52.6	5230	4.94
GB-1	196	49.6	52.8	5250	4.96
GB-1	197	49.8	53.0	5270	4.98
GB-1	198	50.0	53.2	5290	5.00
GB-1	199	50.2	53.4	5310	5.02
GB-1	200	50.4	53.6	5330	5.04
GB-1	201	50.6	53.8	5350	5.06
GB-1	202	50.8	54.0	5370	5.08
GB-1	203	51.0	54.2	5390	5.10
GB-1	204	51.2	54.4	5410	5.12
GB-1	205	51.4	54.6	5430	5.14
GB-1	206	51.6	54.8	5450	5.16
GB-1	207	51.8	55.0	5470	5.18
GB-1	208	52.0	55.2	5490	5.20
GB-1	209	52.2	55.4	5510	5.22
GB-1	210	52.4	55.6	5530	5.24
GB-1	211	52.6	55.8	5550	5.26
GB-1	212	52.8	56.0	5570	5.28
GB-1	213	53.0	56.2	5590	5.30
GB-1	214	53.2	56.4	5610	5.32
GB-1	215	53.4	56.6	5630	5.34
GB-1	216	53.6	56.8	5650	5.36
GB-1	217				

Electrical Cables have been cut into and pass through main structural beams

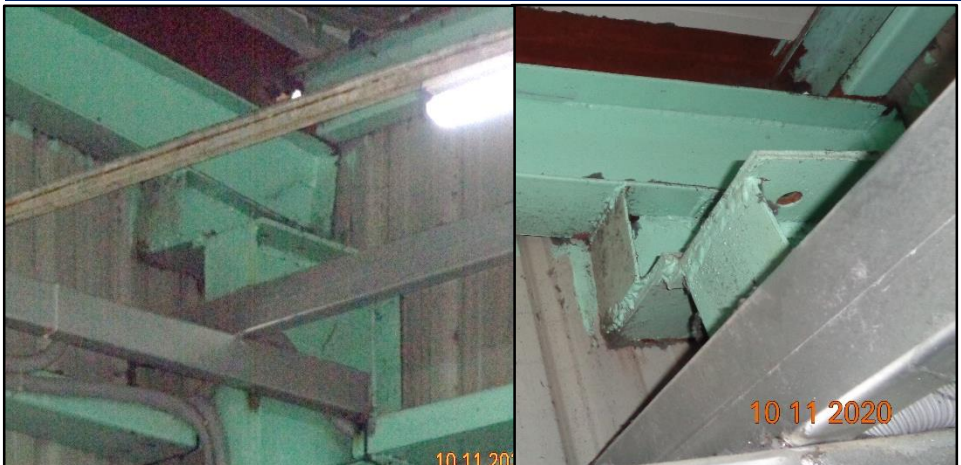


Electrical cables have been cut into and pass through main structural beams. Structural Engineer to Investigate and report on this matter to verify the Structural Integrity of the beams are not compromised

Lack of lateral stability system



Compression strut in long direction was not observed. Also Roof & wall bracing was found missing



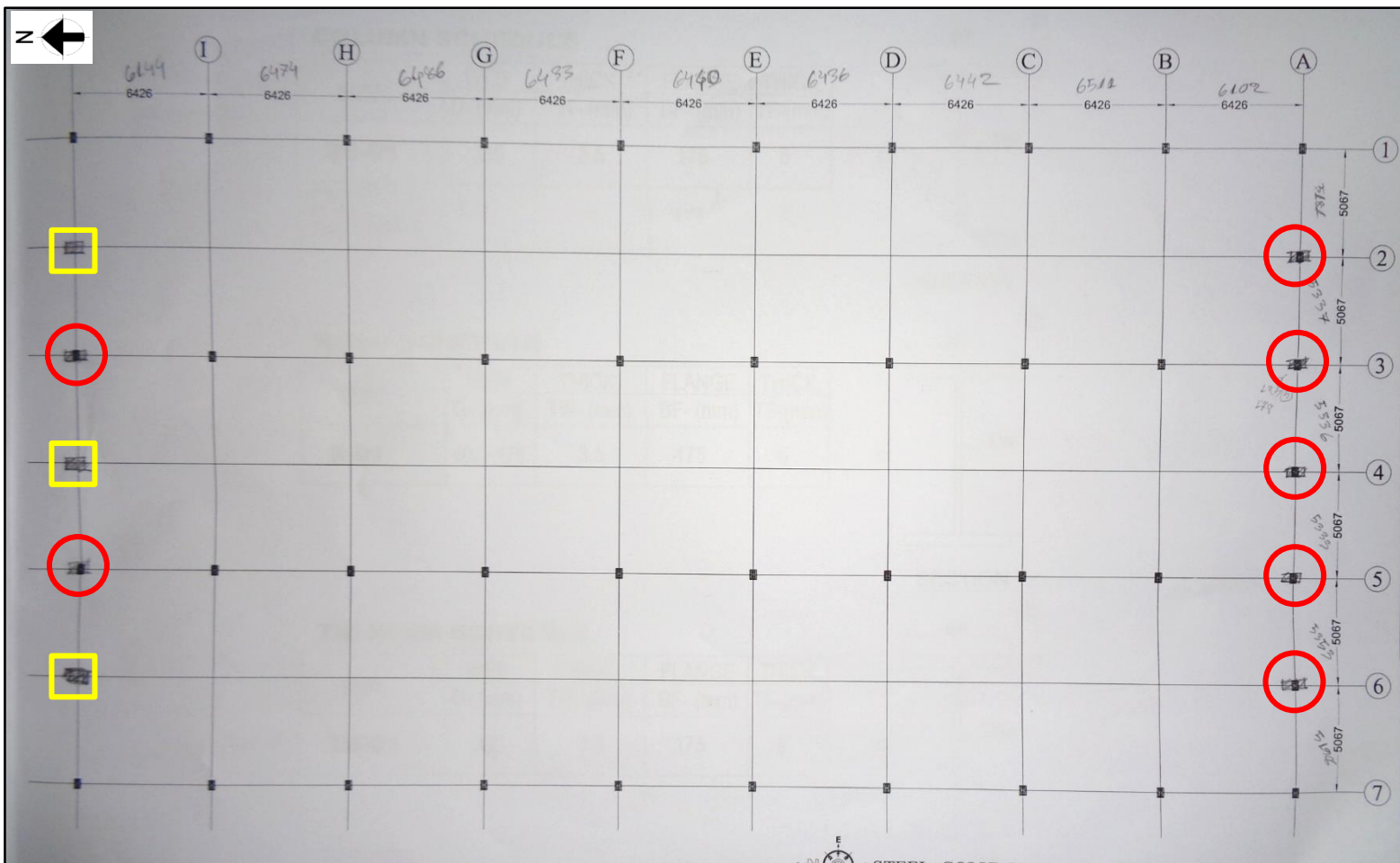
Non-engineered connection

Roof and wall bracing were not found to resist lateral loading along the long direction. Also, few non-engineered connection was found in between rafter & Column.

Factory engineer is required to check the stability of the structure for lateral loading and to check the connection adequacy accordingly.

As per BNBC every building or structure designed shall have its design documents prepared in accordance with 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 and section 1.9.1.2 as per BNBC. During the inspection, design report was not found which is required to be prepared in compliance with section 1.9.1.1 (part-6, BNBC).

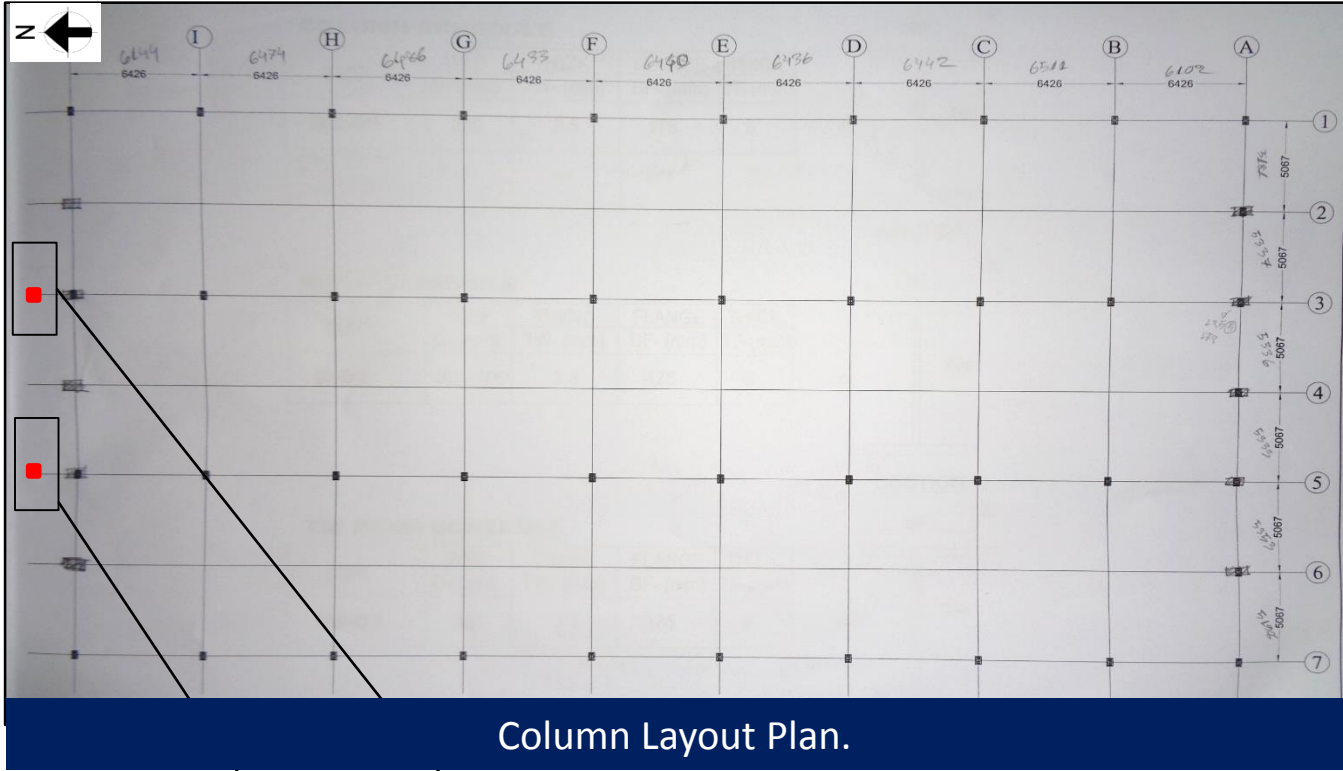
Discrepancies in as-built drawing



Column Layout Plan

Orientation of the steel column found different between as built drawing and actual site condition at circle marked location.

Three numbers of extra columns were found at actual site condition which are not mentioned in as-built drawing. Mismatches are shown in rectangle marked at column layout.



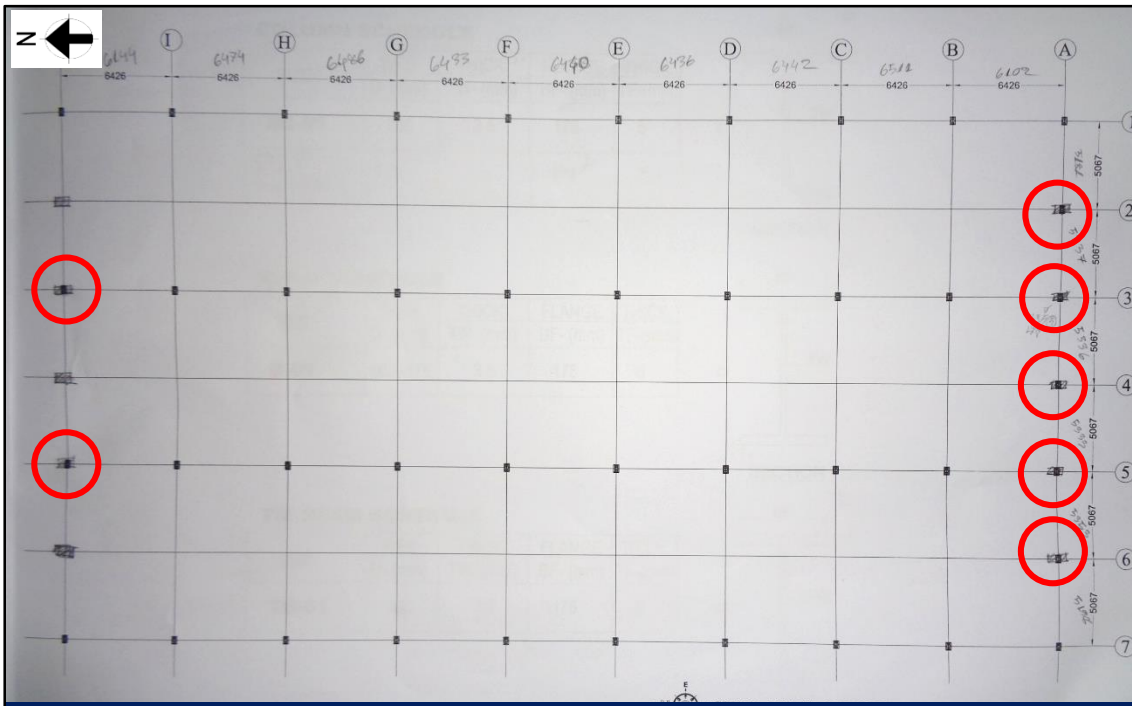
Column Layout Plan.

Canopy was found at north side of the structure. The column of the canopy has not been shown in as-built column layout plan. The marked locations denotes the canopy column location.



Connection of Canopy

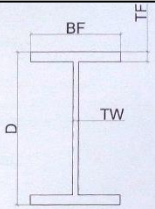
Canopy



Column Layout Plan

Column size at marked location was found mismatched with as-built drawing. During inspection, column size was found Web: 175 & Flange: 125X5. In as-built drawing the column size has been shown Web: 350X3.5 & Flange: 175X5.

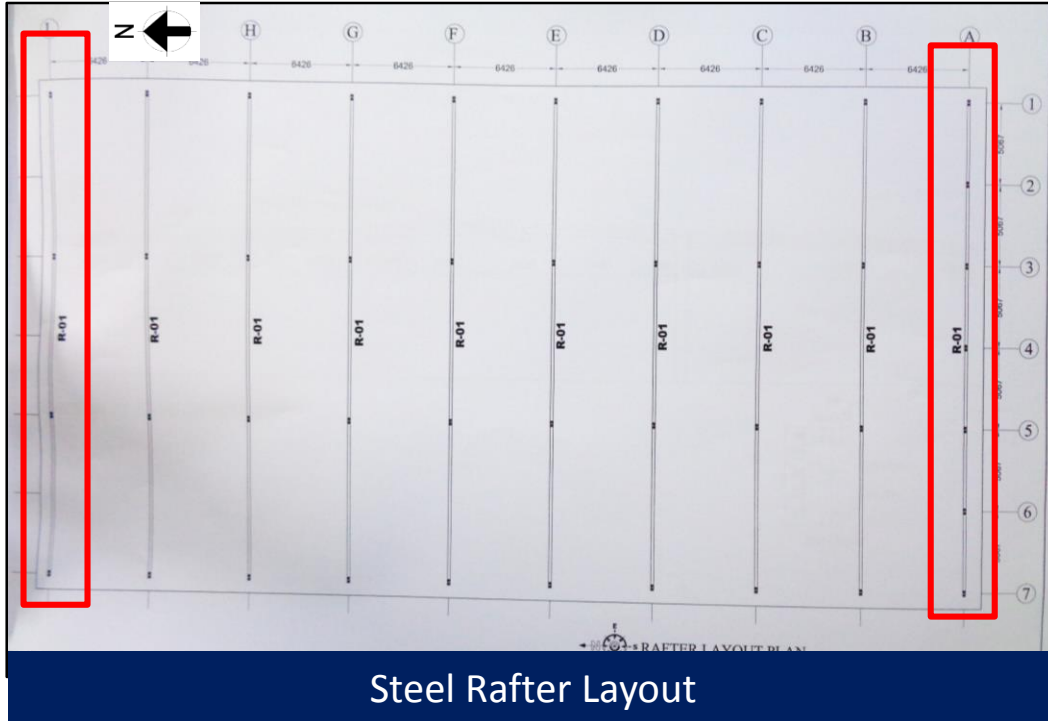
COLUMN SCHEDULE				
SIZE	WEB D- (mm)	THICK. TW- (mm)	FLANGE BF- (mm)	THICK. TF-(mm)
SC-01	350	3.5	175	5



Steel Column Schedule



Measurement of the Steel column



Rafter SCHEDULE				
SIZE	WEB D- (mm)	THICK. TW- (mm)	FLANGE BF- (mm)	THICK. TF-(mm)
R-01	400~175	3.5	175	5

SECTION

Steel Column Schedule

Rafter size at marked location was found mismatched with as-built drawing. During inspection, Rafter size was found Web: 175 & Flange: 125X5. In as-built drawing the Rafter size has been shown Web: 400~175X3.5 & Flange: 175X5.

Factory engineer is required to survey the structures and prepare as-built drawings that are compliance with section 1.9.1.2 as per BNBC.

Corrosion in steel member

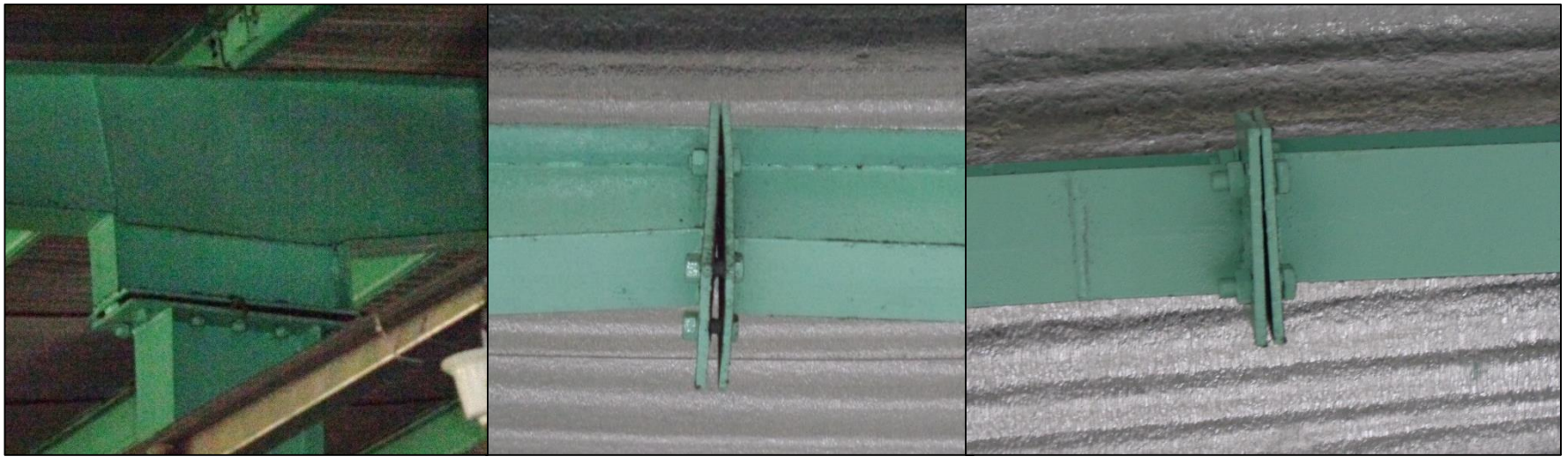
Observations: Shed-1



Corrosion in steel member was found in various locations. Factory is required to identify the corroded locations and investigate the reason of corrosion and suggest proper remedial measure accordingly.

Significant gap and bolt missing at several location

Observation: Shed-1



Gap observed at several locations in connection of rafter-rafter & column-rafter.



Bolt missing observed in several locations.

Significant gaps and bolts missing observed at column rafter joint at several location. Factory engineer is required to install missing bolts and carry out suitable remedial works for connection gap.

Apparently non-engineered shed



Shed-2



Inadequate structural member, poor connection details observed. Apparently non-engineered shed.



Shed-3



Inadequate structural member, poor connection details, unrestraint gable wall observed. Apparently non-engineered shed.

Observations: Shed 2 & 3

Problems Observed

Main Building:

Item 1: Insufficient flexural reinforcement in grade beams.

Item 2: Electrical Cables have been cut into and pass through main structural beams.

Shed-1:

Item 3 : Lack of lateral stability system.

Item 4: Discrepancies in as-built drawing.

Item 5: Corrosion in steel member.

Item 6: Significant gap and bolt missing at several location.

Shed 2 & 3:

Item 7: Apparently non-engineered shed.

Priority Actions

Item No.	Observation	Recommended Action Plan	Recommended Timeline
01	Insufficient flexural reinforcement in grade beams. (Main Building)	Building engineer is required to review the design load and the grade beam adequacy.	6-weeks
02	Insufficient flexural reinforcement in grade beams. (Main Building)	Produce and actively manage a loading plan for all floor plates within the factory considering floor capacity and column capacity.	6-weeks
03	Insufficient flexural reinforcement in grade beams. (Main Building)	Complete implementation of any remedial works deemed necessary by the design review.	6-months
04	Electrical Cables have been cut into and pass through main structural beams. (Main Building)	Building Engineer to Investigate and report on this matter to verify the Structural Integrity of the beams are not compromised.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
05	Electrical Cables have been cut into and pass through main structural beams. (Main Building)	Carry out any remedial works where necessary.	6-months
06	Lack of lateral stability system. (Shed-1)	Building engineer to prepare the design document including a design report, and a set of structural drawings in compliance with section 1.9.1.1 and section 1.9.1.2 as per BNBC.	6-weeks
07	Lack of lateral stability system. (Shed-1)	Complete implementation of any remedial works deemed necessary by the Design Report.	6-months
08	Discrepancies in as-built drawing. (Shed-1)	Building Engineer to survey the structure and prepare accurate as-built (both architectural & structural) drawings.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
09	Corrosion in steel member. (Shed-1)	The building engineer to investigate the reason & extent of corrosion and suggest proper remedial measure accordingly.	6-weeks
10	Corrosion in steel member. (Shed-1)	Take necessary measures to prevent further corrosion and repair the corroded steel members as per engineer's suggestion	6-months
11	Significant gap and bolt missing at several location. (Shed-1)	Identify the locations and carryout suitable repair works for connection gap.	6-weeks
12	Significant gap and bolt missing at several location. (Shed-1)	Install missing bolts where necessary.	6-weeks

Item No.	Observation	Recommended Action Plan	Recommended Timeline
13	Apparently non-engineered shed. (Shed 2 & 3)	Building engineer is required to check the adequacy of the rooftop sheds for gravity and lateral forces. or Replace with the engineered sheds.	6-weeks
14	Apparently non-engineered shed. (Shed 2 & 3)	Carry out remedial works where required.	6-months