

Target Fine-wear Industries Ltd. (9529)

Alauddin Chowdhury Tower, out para, Chandona Chowrasta, Joydebpur , Gazipur

(+23.99009N, 90.38475E)

11.MAY.2014



Identified Priority 1 Concerns

1st Priority 1 Concern



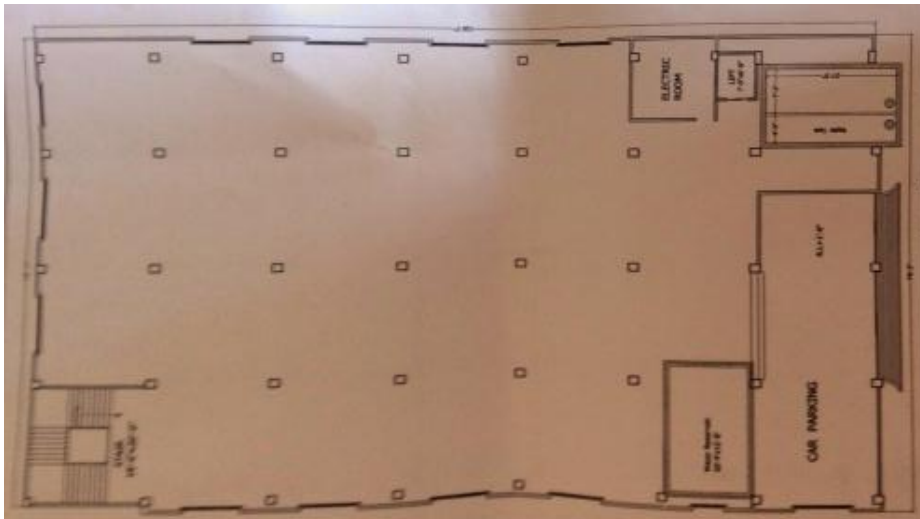
As per as-built drawing and the confirmed from design engineer, there are no shear links provided to resist the shear force at the column joint.

As per our calculation for punching shear at the typical column, the shear stress at the first perimeter is higher than the design concrete shear stress. Based on the code, this is not satisfied for the slab thinner than 200mm.

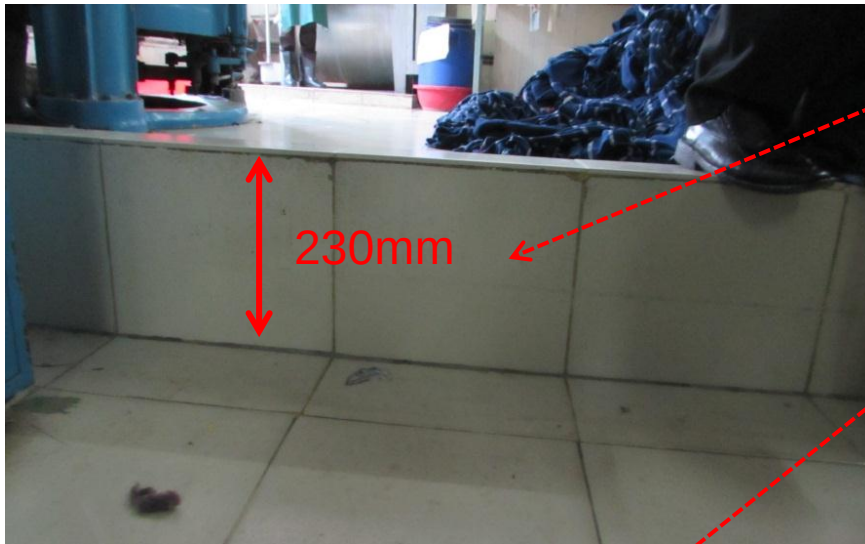
The span/depth ratio for flat slab which controls the limit of deflection for an RC element is defined apparently as $L/30$. The ratio for 6.09m span and 178mm thickness slab is 34 which was higher than ratio requirement. Thinner flat slab will lead to increase the deflection in short-term and long-term and reduce the punching shear resistance as well.

A flat slab system with insufficient punching shear will have the potential to fail without warning, which will cause the whole building to collapse.

The structural drawings also appear to represent incorrectly detailed flat slab rebar arrangement.



2nd Priority 1 Concern



Raised floor with 180mm sand filling and 50mm screed and tile

Industrial machine with a total operating weight exceeding 650kg



The raised floor has been built on level 4. However, the loading from the raised floor was not considered in the structural design. The design finish load was only assumed to be 1.2kPa, whilst the raised floor finishes has been assessed to be approximately 3.24kPa. In addition, the individual washing machine weight of 650kg with the dimension 1.75m x 1.35m, exerts a loading of more than 4kPa, which exceeds the design live load of 2.87kPa

3rd Priority 1 Concern



Each bag of fabric is estimated to be approximately 35kg with the dimension 1.2x0.6m and 10 layers, so the live load for this area is 4.86 kPa which is higher than the design loading 3.0 kPa.

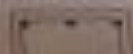
The maximum number of layers allowable should be reduced to a maximum of 6, and spread evenly around the storage area.

Identified Priority 3 Concerns

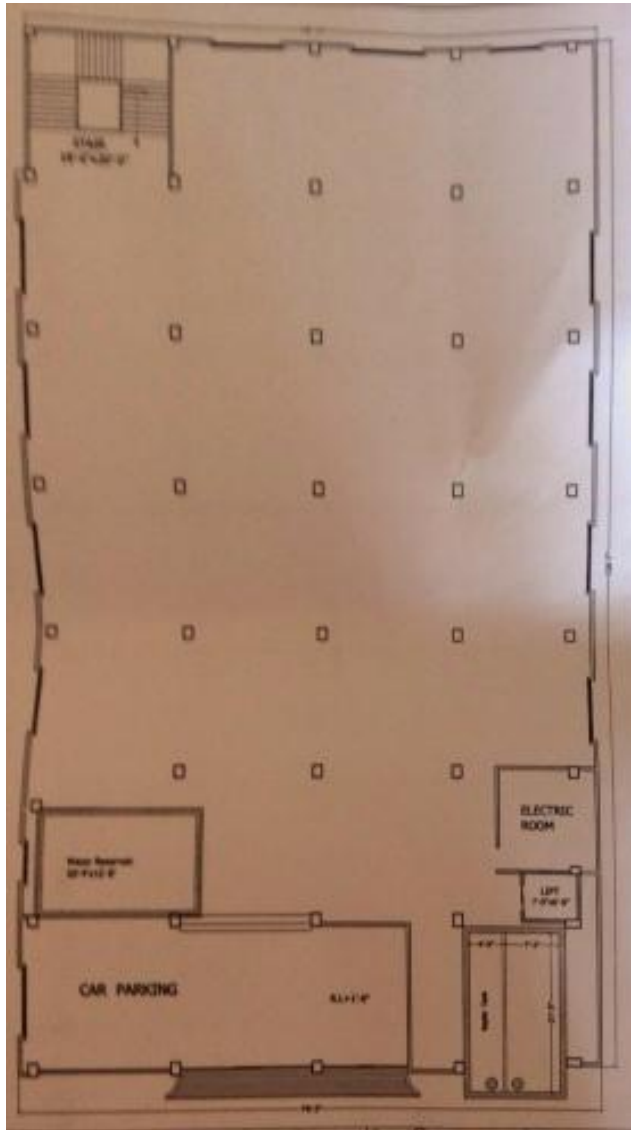
	Below Gr. Floor	Gr-3rd floor	4th-6th floor	7th floor
C-1	 18"x18" 10-16mm rod	 15"x15" 10-16mm rod	 15"x15" 10-16mm rod	 15"x15" 6-16mm rod
C-2	 18"x 21" 12-20 mm rod	 15"x 18" 12-20 mm rod	 15"x 18" 8-20mm rod	 15"x 18" 8-16mm dia rod
C-3	 18"x23" 4-16mm rod 10-22mm rod	 15"x20" 4-16mm rod 10-22mm rod	 15"x20" 14-22 mm rod	 15"x20" 10-16mm rod

Clear covering of column=2" below P.L
10 mm dia stirrup will be use @ 6"x/c below P.L
Clear covering of column 1.5" in long column

14- 20 mm dia rod

C-3	 18"x23" 4-16mm rod 10-22mm rod	 15"x20" 4-16mm rod 10-22mm rod	 15"x20" 14-22 mm rod 10-16mm rod	 15"x20" 10-16mm rod 10-16mm rod
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2nd Priority 3 Concern



The overall structural arrangement does not appear to have any rational form of lateral stability system to resist the wind or earthquake loads. A lateral load analysis is required to be carried out. Together with the very low factor of safety to resist punching shear, the building is at a very high risk of collapse if a significant event occurs.

The design engineer needs to check the deflection and storey drift under lateral wind and seismic load.

We require that these items be investigated in a Detail Engineering Assessment

Priority Actions

Problems Observed Summary

- ITEM 1: (1st Priority 1) The flat slab is not sufficient to resist the punching shear force.**
- ITEM 2: (2nd Priority 1) The raised floor at level 4 exceeds the design finish and live load**
- ITEM 3: (3rd Priority 1) Loading intensity appears to be greater than what was designed for in some locations.**
- ITEM 4: (1st Priority 3) Column rundown results in reduced factor of safety**
- ITEM5: (2nd Priority 3) No lateral load resistance system considered in the structural design of the building**

Item No.	Observation	Recommended Action Plan	Recommended Timeline
1	The flat slab is not sufficient to resist the punching shear force.	Limit the average imposed load on the floor to a maximum of 1.5kPa (30 psf)	Immediate – Now
2	The flat slab is not sufficient to resist the punching shear force.	Carry out intrusive testing of the structure to determine the actual concrete strength, rebar strength and rebar layout	6-weeks
3	The flat slab is not sufficient to resist the punching shear force.	Carry out the strengthening work to increase the punching shear capacity Carry out the strengthening work to provide the lateral load resistance system	6-months
4	The raised floor at level 4 exceeds the design finish and live load	Limit all live load in this area to the absolute minimum. Consider relocating some of the machines	Immediate – Now
5	The raised floor at level 4 exceeds the design finish and live load	Consider removing the raised floor, or constructing raised floor from lightweight fill, such as lightweight concrete or lightweight concrete block	6-weeks
6	The raised floor at level 4 exceeds the design finish and live load	Introduce strengthening works under the slab (such as a steel beam support system) which can direct loads directly to the columns, and reduce loading burden to the slab.	6-months

Item No.	Observation	Recommended Action Plan	Recommended Timeline
7	Loading intensity appears to be greater than what was designed for in some locations.	Immediately reduce stacking height of fabric bag to ensure total load does not exceed 3.0kPa (~60 psf)	Immediate – Now
8	Loading intensity appears to be greater than what was designed for in some locations.	Mark the maximum allowable height of fabric stacking to ensure full compliance	6-weeks
9	Loading intensity appears to be greater than what was designed for in some locations.	Ensure continued compliance to the loading intensity limitations on a long-term basis	6-months
10	Column rundown results in reduced factor of safety	Factory Engineer to review design, loads and columns stresses in area identified above. Verify insitu concrete stresses either by 100mm dia. cores or existing strength data.	6-weeks
11	Column rundown results in reduced factor of safety	Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity	6-months
12	No lateral load resistance system considered in the structural design of the building	Building engineer to check and provide the solution for lateral resisting requirements of the structure.	6-weeks
13	No lateral load resistance system considered in the structural design of the building	As per the results of structural analysis, the building needs to be revised to accord with BNBC building codes with regard to lateral stability.	6-months