

INITIAL STRUCTURAL INTEGRITY ASSESSMENT REPORT (SIAR)

Factory Name: **THE CIVIL ENGINEERS LIMITED**

Address: **401/B Tejgaon Industrial Area Dhaka Dhaka Dhaka
Bangladesh**

Assessor: **Bureau Veritas**

Date: **26 May 2014**





Introduction to the Report

The following report contains a site profile and summary of non-conformities identified during an onsite assessment commissioned by the Alliance for Bangladesh Worker Safety (Alliance) and conducted by a third-party Qualified Assessment Firm (QAF). The assessment was conducted against the Alliance for Bangladesh Worker Safety Assessment Protocols (APs) and Fire Safety and Structural Integrity Standard, which is harmonized with the factory assessment guidelines developed by Bangladesh University of Engineering and Technology (BUET) for the Bangladesh National Tripartite Plan of Action (NTPA). The goal of the Alliance process is to provide clear and practical technical requirements by which Bangladeshi Ready Made Garment (RMG) Factories producing for Alliance members may be consistently and fairly evaluated for fire, structural, and electrical safety in a non-duplicative manner. Each assessment will prompt action plans that will be used by RMG factories to systematically and sustainably improve safety conditions for garment workers. Beyond tracking and reporting on action steps taken in a transparent manner, the Alliance organization and its members will seek to further support factory improvements through technical assistance, training, implementation support for functional Worker Committees, and in some cases financial assistance and wage support for workers if factories are closed for remediation.

The contents of the report do not constitute a guarantee of compliance with the applicable laws, the Alliance Standard or the absolute or continued safety against fire, electrical and/or structural integrity issues that may lead to injury or loss of life. The report is designed to provide a non-exhaustive summary of risk issues, based on a limited sampling and duration of time onsite by the named QAF. Neither the QAF nor the Alliance can certify or guarantee the quality, outcome, or effectiveness of actions taken in response to the report.

For more information and report feedback please go to: www.bangladeshworkersafety.org.





GENERAL INFORMATION

General Information

Factory Name:	THE CIVIL ENGINEERS LIMITED
Address:	401/B Tejgaon Industrial Area Dhaka Dhaka Dhaka Bangladesh
Country:	Bangladesh
Province:	Dhaka
City:	Dhaka
Zip Code:	1208
Audit Duration:	8 Hours
Re-Audit:	Re-Audit After 0 Months
Draft Report Date :	06-01-2014
Final Report Date :	10-28-2014
Are all Action Items From Previous Assessment Completed?:	N/A
Buildings in Complex :	There are 3 buildings in the factory premises out of which one is the main production building and two are ancillary buildings. The buildings are named as: 1) Twelve story RCC main building: (Main Building consists of two buildings one building is 12 story and another is 8 story. These two buildings have separate approval but there is a construction joint between these two buildings and access between these two buildings is available. These two buildings are jointly known as TCEL [The Civil Engineers Ltd] Building), 2) Single story prefab Generator shed, 3) Single story prefab compressor & boiler shed.
Number of Building Levels (Stories) :	1) Twelve story RCC main building: Stories above grade: 12, Stories below grade: 0, 2) Single story prefab Generator shed: Stories above grade: 1, Stories below grade: 0, 3) Single story prefab compressor & boiler shed: Stories above grade: 1, Stories below grade: 0,
Approximate Building Area (SF) :	Total area of buildings in the factory premises: 131470 sft. Building wise breakdown as follows: 1) Twelve story RCC main production building: 129150 sft (Basement: 5500 sft, Ground Floor: 12000 sft, 1st Floor: 12000 sft, 2nd Floor: 12000 sft, 3rd Floor: 12000 sft, 4th Floor: 12000 sft, 5th Floor: 12000 sft, 6th Floor: 12000 sft, 7th Floor: 12000 sft, 8th Floor: 5650 sft, 9th Floor: 5500 sft, 10th Floor: 5500 sft, 11th Floor: 5500 sft, Occupied roof: 5500 sft), 2) Single story prefab Generator shed: 1868 sft, 3) Single story prefab compressor & boiler shed: 452 sft.
Date of Building Construction :	Factory personnel informed the date of building construction as follows: 1) Twelve story RCC main production building: From ground floor to 8th floor: Finished in 1996, From 9th floor to 12th floor: Finished in 2005.
Date of Last Building Renovation/Addition :	1) Twelve story RCC main production building: Fire door installation work was going on at the time of assessment.



Is the Building mixed use?:	No
Ancillary Structures in Complex :	1) Single story prefab Generator shed, 2) Single story prefab compressor & boiler shed.
Number of Ancillary Levels (Stories) :	1) Single story prefab Generator shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 2) Single story prefab compressor & boiler shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1.
Approximate Ancillary Structures Area (SF) :	1) Single story prefab Generator shed: 1868 sft, 2) Single story prefab compressor & boiler shed: 452 sft.
Number of Occupants :	Total number of occupants: 1635. 1) Twelve story RCC main production building: 1633 (Basement: 2, Ground floor: 7, 1st floor: 19, 2nd floor: 326, 3rd floor: 329, 4th floor: 326, 5th floor: 181, 6th floor: 315, 7th floor: 37, 8th floor: 24, 9th floor: 16, 10th floor: 29, 11th floor: 21, Occupied roof: 1), 2) Single story prefab Generator shed: 1, 3) Single story prefab Compressor & Boiler Shed: 1.
Exterior Facade Description :	The exterior of the building is of brick wall in RCC frame. Sliding doors and windows are made of glass in aluminum frame.
Structural System Description :	RCC frame structure system with infilled masonry. RCC slabs are beam supported. The foundation is isolated footing type.



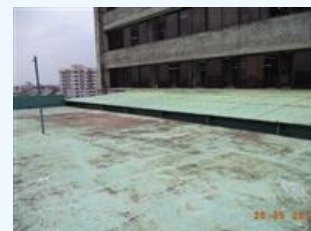
ASSESSMENT FINDINGS

Structural System Design

Question:	Can credible structural documentation indicating general conformance with 2006 BNBC or other comparable applicable international model building code be produced?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	The design document does not clearly demonstrate the conformance with any applicable code.	
Source of Findings:	Document Review: Document review on site.	
Suggested Plan of Action:	Engage a qualified structural engineer to develop the required documents to confirm the structural integrity of the buildings. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20.	
Suggested Deadline Date:	21 Jul 2014	
Standard:	Reference Alliance Standards Part 8 Section 8.2 Structural Integrity of Existing Factory Buildings	
Question:	Are credible structural design documents available for review and kept on site?	
Priority Level:	Medium	
Non-Compliance Level:	2	
Description:	Structural drawings are available; however, design report of the buildings and calculation report of retrofitting work of 8-storied building is not available. Structural engineer for 12-story building is M. A. Mannan, IEB no is not available. Structural engineer for 8-story building is S.M. Shaheedullah, IEB no is not available. Architect of 8-storied building is R. Baker. His signature and IAB no is not available.	
Source of Findings:	Document Review: Document review on site.	
Suggested Plan of Action:	Have a qualified structural engineer prepare design report based on the requirements of Part 8 Section 8.19 of the Alliance Standard. The IEB membership no of this structural engineer needs to be clearly mentioned in structural documents.	
Suggested Deadline Date:	21 Jul 2014	
Standard:	Alliance Standard Part 8 Section 8.19 Required Structural Documentation for New and Existing Factories	



Question:	Can documentation be provided that the building is compliant with the requirements for wind loading and storm surge loadings as detailed in BNBC Part 6 Section 1.5.3?
Priority Level:	Medium
Non-Compliance Level:	2
Description:	There is no clear information available on the design document to understand the consideration of storm surge and wind loading in the design of the building.
Source of Findings:	Document Review: Document review on site.
Suggested Plan of Action:	Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
Suggested Deadline Date:	21 Jul 2014
Standard:	2006 BNBC Part 6 Section 1.5. Compliance may be waived if the Factory Owner provides satisfactory evidence of a cyclone operations plan that includes full evacuation of the factory in advance of any approaching cyclone"
Question:	If the structure has been previously expanded, was the structural impact on the entire structure analytically evaluated and confirmed by a qualified structural engineer.
Priority Level:	Medium
Non-Compliance Level:	2
Description:	There is an undocumented steel frame roof structure on the roof level of the eight story building.
Source of Findings:	Document Review: Document review on site., Visual Assessment: Visual assessment on site.
Suggested Plan of Action:	Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.
Suggested Deadline Date:	01 Dec 2014
Standard:	Reference Alliance Standards Part 8 Section 8.1 Applicability of Building Code.
Question:	Have provisions been made in floors or decks for a concentrated load (such as heavy equipment, water tanks, stored materials, etc) applied at a location wherever this load acting upon an otherwise unloaded floor would produce stresses greater than those caused by a uniform load?
Priority Level:	Medium
Non-Compliance Level:	2
Description:	There is a 40'x35'x5' RCC water tank on the roof level of the twelve-story





	building. One 1000L plastic water tank is also placed over this water tank. Although, the RCC water tank is shown in structural drawings and it is very heavy (198000L capacity), no analytical proof is available in order to confirm that provisions have been made for this RCC tank.	
Source of Findings:	Document Review: Document review on site., Visual Assessment: Visual assessment on site.	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate RCC water tank. If provisions have not been made, have a qualified structural engineer develop a remediation plan.	
Suggested Deadline Date:	21 Jul 2014	
Standard:	Alliance Standard Part 8 Section 8.13 and 8.14	
Question:	Are Certificates of Occupancy available for review?	
Priority Level:	Low	
Non-Compliance Level:	1	
Description:	Certificates of occupancy are not available for review.	
Source of Findings:	Document Review: Document review on site.	
Suggested Plan of Action:	Apply for issuance of Certificate of Occupancy and pursue the matter to obtain the same.	
Suggested Deadline Date:	21 Jul 2014	
Standard:	Alliance Standard Part 8 Section 8.3 Preliminary Structural Assessment	
Structural System Construction		
Question:	Is the structural system free of distress, settlement, shifting, or cracking in columns or walls?	
Priority Level:	High	
Non-Compliance Level:	1	
Description:	There are no cracks in the columns. However, there are some masonry cracks in the walls which do not affect the performance of the structures.	
Source of Findings:	Visual Assessment: Visual assessment on site.	
Suggested Plan of Action:	Have a qualified structural engineer provide further testing and analysis of cracking in walls and provide a remediation plan to correct noted issues.	
Suggested Deadline Date:	21 Jul 2014	
Standard:	Alliance Standard Part 8 Section 8.3.3	



Question:	Have all areas of needed maintenance, including areas with efflorescence, dampness, standing water on rooftops, and corrosion been addressed.	
Priority Level:	Medium	
Non-Compliance Level:	2	
Description:	Dampness is noted in all floors of the 8-story building.	
Source of Findings:	Visual Assessment: Visual assessment on site.	
Suggested Plan of Action:	Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.	
Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.26 Durability and Maintenance	
Question:	Are all non-structural elements suspended from, attached to, or resting atop the structure adequately anchored and braced to resist earthquake forces?	
Priority Level:	Medium	
Non-Compliance Level:	2	
Description:	In the store room of ground floor and fifth floor there are some racks which needs to be braced and anchored. Also, on the roof of 12 storied building there are some steel water tanks and a UPVC water tank. Bracing and anchorage should be provided. In ground floor, 4th floor and 7th floor there are some racks need to be braced and anchored.	
Source of Findings:	Visual Assessment: Visual assessment on site.	
Suggested Plan of Action:	Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.	
Suggested Deadline Date:	01 Sep 2014	
Standard:	Alliance Standards Part 8 Section 8.18 Seismic Bracing of Key Non-Structural Elements and 2006 BNBC Part 6	
Question:	Are structural steel members free of corrosion, physical damage or other types of deterioration?	
Priority Level:	Medium	
Non-Compliance Level:	1	
Description:	Isolated corrosion was noted in CI sheet of generator shed.	
Source of Findings:	Visual Assessment: Visual assessment on site.	
Suggested Plan of	Complete further testing on areas of deterioration and have a qualified	



Action:	structural engineer develop a remediation plan.	
Suggested Deadline Date:	28 Nov 2014	
Standard:	Alliance Standard Part 8 Section 8.26	
Question:	Is expansion joint material free from cracking and other forms of deterioration?	
Priority Level:	Low	
Non-Compliance Level:	1	
Description:	There is an expansion joint between eight-story and twelve-story building, which is filled with mortar. This will make the expansion joint ineffective. Also, cracks have been observed at expansion joint material.	
Source of Findings:	Visual Assessment: Visual assessment on site.	
Suggested Plan of Action:	Remove deteriorated expansion joint material and provide new approved material at the expansion joint.	
Suggested Deadline Date:	01 Sep 2014	
Standard:	Alliance Standard Part 8 Section 8.26 Durability and Maintenance	

Structural Safety Programs

Question:	Is a program in place to ensure that the live loads for which a floor or roof is or has been designed will not be exceeded?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	There is no program that will ensure that the live loads for which a floor or roof is or has been designed will not be exceeded.	
Source of Findings:	Document Review: Document review on site.	
Suggested Plan of Action:	Develop a program to ensure that all live loads for which a floor or roof has been designed for will not be exceeded. The designated Load Manager shall oversee this program and ensure it is enforced.	
Suggested Deadline Date:	07 Jul 2014	
Standard:	Alliance Standard Part 13 Section 13.7 and Part 8 Section 8.9.	
Question:	Have Load Plans been prepared for each floor documenting the actual maximum operational loading that is intended and/or allowable on each floor.	
Priority Level:	Low	
Non-Compliance Level:	3	



Description:	There is no load plan available showing the actual maximum operational loading that is allowable.	
Source of Findings:	Document Review: Document review on site.	
Suggested Plan of Action:	Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3	
Suggested Deadline Date:	21 Jul 2014	
Standard:	Alliance Standard Part 8 Section 8.10 Floor Loading Plans (Load Plans)	
Question:	Are Floor Load Plans posted as required?	
Priority Level:	Low	
Non-Compliance Level:	3	
Description:	Floor load plans are not posted.	
Source of Findings:	Visual Assessment: Visual assessment on site.	
Suggested Plan of Action:	Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard and have it posted in all required location.	
Suggested Deadline Date:	21 Jul 2014	
Standard:	Alliance Standard Part 8 Section 8.20.5.3	
Question:	Are areas used for storage of work materials and work products, clearly marked to indicate the acceptable loading limits as described in the Load Plan for that floor?	
Priority Level:	Low	
Non-Compliance Level:	3	
Description:	There is no load plan. Also, there is no marking on the floor to designate spaces and height for storage of work materials.	
Source of Findings:	Visual Assessment: Visual assessment on site.	
Suggested Plan of Action:	Have a qualified structural engineer prepare a load plan for each load and have the floors marked for designating storage area as per the developed load plan.	
Suggested Deadline Date:	21 Jul 2014	
Standard:	Alliance Standard Part 8 Section 8.11 Floor Load Markings	
Question:	Is a designated representative (Factory Load Manager), who is onsite full time,	



	trained regarding the structural floor capacity, and serves as an ongoing vendor resource and monitor of operational factory floor loadings?	
Priority Level:	Low	
Non-Compliance Level:	3	
Description:	There is no designated representative (Factory Load Manager), who is onsite full time, trained regarding the structural floor capacity, and serves as an ongoing vendor resource and monitor of operational factory floor loadings.	
Source of Findings:	Document Review: Document review on site.	
Suggested Plan of Action:	Designate a representative as the Factory Load Manager. The Factory Owner shall ensure that at least one individual, the Factory Load Manager who is located onsite full time at the factory, is trained in calculating operational load characteristics of the specific factory. The Factory Load Manager shall serve as an ongoing resource to RMG vendors and be responsible to ensure that the factory operational loads do not at any time exceed the factory floor loading limits as described on the Floor Loading Plans.	
Suggested Deadline Date:	07 Jul 2014	
Standard:	Alliance Standards Part 8 Section 8.9 Factory Load Manager	