

INITIAL STRUCTURAL INTEGRITY ASSESSMENT REPORT (SIAR)

Factory Name: **SEA BLUE TEXTILE LIMITED**

Address: **Plot NO-10-11, Sector 6, CEPZ, Chittagong Chittagong
Chittagong Bangladesh**

Assessor: **BD Technologies**

Date: **02 Apr 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:	SEA BLUE TEXTILE LIMITED
Address:	Plot NO-10-11, Sector 6, CEPZ, Chittagong Chittagong Chittagong Bangladesh
Country:	Bangladesh
Province:	Chittagong
City:	Chittagong
Zip Code:	4223
Audit Duration:	1 Days 8 Hours
Re-Audit:	Re-Audit After 0 Months
Draft Report Date :	04/09/2014
Final Report Date :	05/23/2014
Are all Action Items From Previous Assessment Completed?:	N/A
Buildings in Complex :	• Building#1-4 story main factory building housing the storage, printing, sewing, washing and cutting operations, • Building#2-5 story main factory building housing the storage and finishing section. • Building#3-4 story office building housing the office, storage and lab section. • Building#4- 6 story office building housing sewing, knitting, dyeing, finishing and dining.
Number of Building Levels (Stories) :	Building-1(4 storied), Building-2 (5 storied), Building-3(4 storied), Building-4(6 storied).
Approximate Building Area (SF) :	Building-1(12123x4=48492 sft), Building-2 (15533x5=77665 sft), Building-3(6427x4=25708 sft), Building-4(18522x6=111132 sft). [Total floor area-2,62,997sqft]
Date of Building Construction :	Building-1(1995), Building-2 (2002), Building-3(2004), Building-4(2006).
Date of Last Building Renovation/Addition :	N/A
Is the Building mixed use?:	No
Ancillary Structures in Complex :	Boiler shed and Maintenance room Shed
Number of Ancillary	1

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Levels (Stories) :	
Approximate Ancillary Structures Area (SF) :	Boiler shed(1027 sq ft.) and Maintenance room Shed.(1760 sq ft.).
Number of Occupants :	Building-1(Ground floor-60, 1st floor-0, 2nd floor-220, 3rd floor-70). Building-2 (Ground floor-20, 1st floor-200, 2nd floor-253, 3rd floor-200, 4th-canteen), Building-3(Ground floor-2, 1st floor-50, 2nd floor-26, 3rd floor-15). Building-4(Ground floor-43, 1st floor-10, 2nd floor-80, 3rd floor-270, 4th floor-280, 5th floor-96).
Exterior Facade Description :	Infill burnt clay bricks. Aluminium framed glass window.
Structural System Description :	The primary type of structural system of the buildings are reinforced concrete and the lateral load-resisting system for the buildings are concrete frame. There is no discontinuity (in diaphragm, frame or soft story) in lateral load path. The typical floor framing system is monolithic RC slab with beams. The cast in situ bored pile foundation supports the structure.
Issues were not found during the structural integrity assessment that required the Emergency Escalation Protocol (and referral to NTC Review Panel)?:	No Finding



ASSESSMENT FINDINGS

Structural System Design

Question:	Has evidence of structural integrity been provided using a Preliminary Structural Assessment?	
Priority Level:	High	
Non-Compliance Level:		
Description:	The original structural documentation are not fully in compliance with BNBC Part 6 section 1.19. As per alliance standard 8.2.1 the structural integrity of existing factory is not confirmed due to lack of credible structural documentation. But the columns FoS is above 1.86 and there are no sign of cracks or distress in lateral load bearing elements for the actual in situ conditions in the factory. So the observed structural performance of the overall structure is accepted as evidence of a reasonable level of structural integrity according to interpretive guideline of alliance standard section 8.2.1. Our team collected two building assessment reports furnished by Uttaron Technologies and certifications signed by two engineers dated 28-07-2013 during visit on 2nd April 2014. The conclusions of the report are " ...Both the noted buildings are constructed as per structural design & drawings. We assessed & found the buildings are suitable for use of the garments manufacturing or similar production purpose." But our opinion is that the scope of that assessment is dissimilar with the scope of Preliminary Structural Assessment as per alliance standard.	
Source of Findings:	Document Review: during visit on 2nd April 2014.	
Suggested Plan of Action:	Engage a qualified structural engineer to conduct a Structural Integrity Assessment of all building as per alliance standard.	
Suggested Deadline Date:	15 Jun 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:	3	
Description:	Income structural design documents available for review and kept on site. Although those drawings are approved from EPZ authority, they are not credible according to BNBC part 6 section 1.9.	
Source of Findings:	Document Review: during visit on 2nd April 2014.	
Suggested Plan of Action:	Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19/8.20 of the Alliance Standard.	



Suggested Deadline Date:	15 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.19 Required Structural Documentation for New and Existing Factories	
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:	No credible structural documentation indicating general conformance with 2006 BNBC or other comparable applicable international model building code could be produced before the assessment team. The available drawings do not comply with BNBC 2006 part 6 section 1.9	
Source of Findings:	Document Review: document provided during visit on 2nd April 2014.	
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:	15 Jun 2014	
Standard:	Reference Alliance Standards Part 8 Section 8.2 Structural Integrity of Existing Factory Buildings	
Question:	If built after 2006, can documented compliance with the seismic and wind requirements of the 2006 BNBC be provided?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	Building no.4 is constructed after 2006. The available documents of that building are not credible and the the seismic and wind requirements of the 2006 BNBC are not referred or mentioned. So the available documents are not in compliance with the seismic and wind requirements of the 2006 BNBC.	
Source of Findings:	Document Review: documents provided during visit on 2nd April 2014.	
Suggested Plan of Action:	Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.	
Suggested Deadline Date:	15 Jun 2014	
Standard:	Alliance Standards Part 8 Section 8.17 Design for Lateral Loads and 2006 BNBC Part 6 Section 1.5	
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:	3	
Description:	Building no.4 is constructed in 2006. But the requirements for wind loading and storm surge loadings as detailed in BNBC Part 6 Section 1.5.3 are not mentioned or referenced in the available documentation.	
Source of Findings:	Document Review: during visit on 2nd April 2014.	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.	
Suggested Deadline Date:	15 Jun 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:	3	
Description:	All the factory buildings were expanded in different time period following the available structural documents which are not credible as per BNBC Part 6 section 1.9. The expansion provisions and detailings are not provided in the available structural drawings. There is no evidence of structural engineer involvement in the expansion periods of the factory building.	
Source of Findings:	Document Review: document provided during visit on 2nd April 2014.	
Suggested Plan of Action:	Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.	
Suggested Deadline Date:	15 Jun 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:	3
Description:	No such provisions have been made in floors for a concentrated load (water tanks at roof top, stored materials like elastic rubber, accessories and finished goods at 1st floor of building no.04). The structural capacity of the factory to safely support the water tank and stored materials could not be confirmed and documented by a qualified structural engineer.
Source of Findings:	Visual Assessment: visit on 2nd April 2014.
Suggested Plan of Action:	Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads. If provisions have not been made, have a qualified structural engineer develop a remediation plan.
Suggested Deadline Date:	15 Jun 2014
Standard:	Alliance Standard Part 8 Section 8.13 and 8.14
Question:	Where density of operations, storage of materials, or equipment weights require live load capacity in excess of 2.0 kN/m ² (42 psf), do the design documents confirm that the required load capacity exists? Or has the load capacity been analytically confirmed and certified by an Alliance-qualified structural engineer?
Priority Level:	Medium
Non-Compliance Level:	3
Description:	Original available design documents are not credible. The live load or occupancy type are not mentioned in the existing architectural and structural drawings. The elastic rubber, accessories, finished goods storage in the 1st floor building no.04 and water tanks in rooftop were evaluated and found exceeding the specified load capacity 2.0 kN/m ² (42psf).
Source of Findings:	Visual Assessment: visit on 2nd April 2014.
Suggested Plan of Action:	Have a qualified structural engineer confirm that capacity to support the load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.
Suggested Deadline Date:	15 Jun 2014
Standard:	Alliance Standards Part 8 Section 8.15 Minimum Floor Design Loads
Question:	Are Certificates of Occupancy available for review?
Priority Level:	Low





Non-Compliance Level:	3
Description:	No.
Source of Findings:	Document Review: visit on 2nd April 2014.
Suggested Plan of Action:	Provide Certificates of Occupancy for review.
Suggested Deadline Date:	15 Jun 2014
Standard:	Alliance Standard Part 8 Section 8.3 Preliminary Structural Assessment
Question:	Is a Geotechnical Report available for review and kept on site?
Priority Level:	Low
Non-Compliance Level:	3
Description:	Geotechnical reports of building no.4 (proposed ten storied/existing 6 storied) are available and kept on site. Geotechnical reports of remaining three buildings are not available and kept on site. see photo
Source of Findings:	Document Review: during visit on 2nd April 2014.
Suggested Plan of Action:	Under guidance from a qualified structural engineer arrange geotechnical investigation at close vicinity of the structure and make the report available for review.
Suggested Deadline Date:	15 Jun 2014
Standard:	Alliance Standard Part 8 Section 8.2 Structural Integrity of Existing Factory Buildings



Structural System Construction

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:	3
Description:	Standing Water was found on roof-top of Building no.3 & Building no.4. Efflorescence / dampness in infill brick wall at 4th floor of building. no.4. Exposed hole in columns for wiring.
Source of Findings:	Visual Assessment: visit on 2nd April 2014.
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:	15 Jun 2014
Standard:	Alliance Standard Part 8 Section 8.26 Durability and Maintenance
Question:	If yes, have the structural members constructed with MCAC been investigated by an appropriate program of in-situ testing and representative destructive testing or core samples?
Priority Level:	Medium
Non-Compliance Level:	3
Description:	Only non destructive rebound hammer test was conducted onsite to find concrete strength.
Source of Findings:	Visual Assessment: 2nd April 2014.
Suggested Plan of Action:	Have a qualified structural engineer assess the durability aspects as suggested in Alliance Standard Part 7 Section 7.2 including core cutting and testing is suggested to ensure concrete strength and take appropriate remedial measures. But it is important to note that the destructive core testing is only technically required if the circumstances stated in Alliance Standard section 7.2.2.1.1 are met, but that the testing is advised nonetheless.
Suggested Deadline Date:	15 Jun 2014
Standard:	Reference Alliance Standards Part 7 Building Materials Section 7.2 Masonry-chip aggregate concrete (MCAC)
Question:	Are any structural elements constructed with MCAC exposed to rainfall or other sources of water sealed with a protective coating to prevent water intrusion?
Priority Level:	Medium
Non-Compliance Level:	3
Description:	All the top roof slab of three (1,2,3 no) buildings are constructed with MCAC exposed to rainfall or other sources of water like leakage of water supply pipe network (see photo) are not sealed with a protective coating to prevent water intrusion.
Source of Findings:	Visual Assessment: visit on 2nd April 2014.
Suggested Plan of Action:	Provide a protective coating at the structural elements constructed with MCAC exposed to rainfall or other sources of water. Have protective coating approved by the Alliance or a qualified structural engineer
Suggested Deadline Date:	15 Jun 2014





Standard:	Alliance Standards Part 7 Building Materials Section 7.2 Masonry-chip aggregate concrete (MCAC).	
Question:	Are structural steel members free of corrosion, physical damage or other types of deterioration?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	The structural steel members of building no.1 is in good condition. But the steel shade at roof of building no.2 is looks like non-engineered(see photo). Here the columns rest on roof floor.	
Source of Findings:	Visual Assessment: visit on 2nd April 2014.	
Suggested Plan of Action:	Complete further testing on areas of deterioration and have a qualified structural engineer develop a remediation plan.	
Suggested Deadline Date:	15 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.26	
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:		
Description:	Storage racks in 1st floor of Building 4 were without seismic bracing. AC systems at rooftop of Building no.3, Rooftop plastic water tanks at roof of Building no.02 also require seismic bracing as per alliance standard 8.18.	
Source of Findings:	Visual Assessment: visit on 2nd April 2014.	
Suggested Plan of Action:	Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard section 8.18.	
Suggested Deadline Date:	15 Jun 2014	
Standard:	Alliance Standards Part 8 Section 8.18 Seismic Bracing of Key Non-Structural Elements and 2006 BNBC Part 6	
Question:	The exterior façade is free of cracking.	
Priority Level:	Low	
Non-Compliance Level:	3	
Description:	Few boundary separation cracks between brick work and roof top in building no.3	
Source of Findings:	Photograph: photo taken during visit on 2nd April 2014.	



Suggested Plan of Action:	Have a qualified structural engineer provide further analysis of the identified cracks to determine the appropriate course of corrective action.
Suggested Deadline Date:	15 Jun 2014
Standard:	Alliance Standard Part 8 Section 8.2
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 in place to ensure that the live loads for which a floor or roof is or has been designed will not be exceeded.
Source of Findings:	Visual Assessment: visit on 2nd April 2014.
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:	15 Jun 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:	Load Plans Have been not prepared for each floor documenting the actual maximum operational loading that is intended and/or allowable on each floor.
Source of Findings:	Document Review: document review on 2nd April 2014.
Suggested Plan of Action:	Have a qualified structural engineer develop Floor Loading Plans per the requirements of Alliance Standard Part 8 Section 8.20.5.3
Suggested Deadline Date:	15 Jun 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:	No floor load plans are posted as required.
Source of Findings:	Visual Assessment: visit on 2nd April 2014.
Suggested Plan of Action:	Have a qualified structural engineer prepare load plans including the information required in Section 8.20.5.3 of the Alliance Standard and posted as required.
Suggested Deadline Date:	15 Jun 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:	Areas used for storage of work materials and work products, are not clearly marked to indicate the acceptable loading limits as described in the Load Plan for that floor.
Source of Findings:	Visual Assessment: visit on 2nd April 2014
Suggested Plan of Action:	Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan
Suggested Deadline Date:	15 Jun 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:	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 available during visit.
Source of Findings:	Visual Assessment: visit on 2nd April 2014.
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

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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:

15 Jun 2014

Standard:

Alliance Standards Part 8 Section 8.9 Factory Load Manager