INITIAL STRUCTURAL INTEGRITY ASSESSMENT REPORT (SIAR)

Factory Name:	**Shehan Specialized Textile Mills Ltd.**
Address:	**Plot #11-12, Sector #1/A, Road #5 CEPZ, Chittagong Chittagong Chittagong Bangladesh**
Assessor:	**BD Technologies**
Date:	**01 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:	Shehan Specialized Textile Mills Ltd.
Address:	Plot #11-12, Sector #1/A, Road #5 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 6 Months
Draft Report Date :	04/11/2014
Final Report Date :	05/23/2014
Are all Action Items From Previous Assessment Completed?:	N/A
Buildings in Complex :	2 (One three storied building and one five storied Building)
Number of Building Levels (Stories) :	One three storied (shehan, B1) and one five storied (Smart jacket, B2) R.C.C. Building
Approximate Building Area (SF) :	3 storied B1 (201039 sft) 5 storied B2 (141745 sft)
Date of Building Construction :	2008
Date of Last Building Renovation/Addition :	2011
Is the Building mixed use?:	No
Ancillary Structures in Complex :	One boiler and substation room, One fire pump room.
Number of Ancillary Levels (Stories) :	Boiler and substation room (level=1, H= 12 ft), Fire pump room (level=1, H= 12).
Approximate Ancillary	One boiler and substation room (600 sft), One fire pump room (400 sft).

Structures Area (SF) :	
Number of Occupants :	G.F. of both buildings = 1780), 1st Floor of both buildings = 1800 = 2nd Floor of both buildings = 1000, 3rd Floor of R.C.C. building B2 = 200,4th and 5th Floor B2 = Dining
Exterior Facade Description :	Burnt clay in brick masonry walls. Aluminium framed with glass
Structural System Description :	The primary type of structural system of the three storied building is a flat plate structure. There is no separate lateral load resisting system such as shear wall. The foundation of the structure for three storied (B1) is isolated column footing. The upper floor is made of steel structure frame. The five storied typical floor framing system is monolithic RC slab with beams. The foundation of five storied (B2) is cast in situ bored pile. The frame is regular.

ASSESSMENT FINDINGS

Structural System Design		
Question:	Are credible structural design documents available for review and kept on site?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	A few structural documents for both buildings are available for review and kept on site. But those structural documents are not credible as per BNBC part 6 section 1.9.	
Source of Findings:	Document Review: visit on 01.04.2014.	
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:	30 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: visit on 01.04.2014.	
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:	30 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:	The available documents are not in compliance with the seismic and wind requirements of the 2006 BNBC.	
Source of Findings:	Document Review: visit on 01.04.2014.	
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:	30 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:	Documentation can not 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.	
Source of Findings:	Document Review: visit on 01.04.2014.	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.	
Suggested Deadline Date:	30 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:	Is a clear and redundant load path to resist lateral loads provided?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	There is no apparent lateral load resisting system for the three story building (Building 1).	
Source of Findings:	Visual Assessment: 1st April 2014	
Suggested Plan of Action:	Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.	

Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standards Part 8 Section 8.17 Design for Lateral Loads and 8.3.3. 2006 BNBC Part 6 Section 1.5	
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:	High storage loading was noted in the following locations, without apparent provisions made to accommodate the loads: Stored materials (fabrics) at 2nd floor of shehan specialized mills (B1) and 3rd floor of Smart jackets (that is Building no.2 or B2)	
Source of Findings:	Visual Assessment: visit on 1st 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:	30 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/m2 (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:	The design documents do not confirm that the required load capacity in excess of 2.0 kN/m2 (42 psf) exists in 2nd floor of three storied building (B1) and 2nd floor of six storied building (B2). The load capacity has not been analytically confirmed and certified by an Alliance-qualified structural engineer.	
Source of Findings:	Visual Assessment: visit on 1st 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:	30 Jun 2014	
Standard:	Alliance Standards Part 8 Section 8.15 Minimum Floor Design Loads	

Question:	Is a Geotechnical Report available for review and kept on site?	
Priority Level:	Low	
Non-Compliance Level:	3	
Description:	Geotechnical report of building no. 1 is not available for review. Geotechnical report of building no. 2 is available for review (see photo of cover page). But that was for 4 (four) storied building as shown in the attached photo. As the building no.2 is 6-storied on document (existing 5 storied)the report should reviewed for sufficient depth.	
Source of Findings:	Document Review: visit on 01.04.2014.	
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:	30 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.2 Structural Integrity of Existing Factory Buildings	
Question:	Are Certificates of Occupancy available for review?	
Priority Level:	Low	
Non-Compliance Level:	2	
Description:	No certificates of occupancy were available for review.	
Source of Findings:	Visual Assessment: visit on 01.04.2014.	
Suggested Plan of Action:	Provide Certificates of Occupancy for review.	
Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.3 Preliminary Structural Assessment	
Structural System Construction		

Question:	Are the performance of key structural elements such as columns, slender columns, flat plates and transfer structures satisfactory?	
Priority Level:	High	
Non-Compliance Level:	3	
Description:	Cracking was observed in the columns and flat plate near the joint area of two building. See photo.	
Source of Findings:	Photograph: photo taken during visit on 1st April 2014.	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm structural performance of the structure.	
Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.3.3	
Question:	Is the structural system free of distress, separations, or cracking that indicates lack of performance or overstress of the lateral load-carrying system?	
Priority Level:	High	
Non-Compliance Level:	3	
Description:	Cracking was observed in the columns and flat plate near the joint area of two building. See photo.	
Source of Findings:	Visual Assessment: visit on 1st April 2014.	
Suggested Plan of Action:	Engage a qualified structural engineer to provide additional investigation into the areas of distress, separations, or cracking and provide a remediation plan if required.	
Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.3.3	
Question:	Is the structural system free of distress, settlement, shifting, or cracking in columns or walls?	
Priority Level:	High	
Non-Compliance Level:	3	
Description:	Cracking was observed in the columns and flat plate near the joint area of two building. See photos.	
Source of Findings:	Photograph: photo taken during site visit on 1st April 2014.	
Suggested Plan of Action:	Have a qualified structural engineer provide further testing and analysis of distress, settlement, shifting, or cracking in columns or walls and provide a remediation plan to correct noted issues.	

Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.3.3	
Question:	Is the structure free from any major/progressive distress?	
Priority Level:	High	
Non-Compliance Level:	3	
Description:	The cracks at RCC column located along the joint between the two buildings could potentially indicate major/progressive distress.	
Source of Findings:	Photograph: photo taken during visit on 1st April 2014.	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm the causes of such distress and suggest appropriate remedial measures. The investigation should be conducted quickly to confirm whether the condition presents an immediate hazard.	
Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standards 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:	3	
Description:	Efflorescence and dampness have seen in the generator room, air compressor room. Standing water at rooftop of 6-storied building.	
Source of Findings:	Visual Assessment: visit on 1st April 2014.	
Suggested Plan of Action:	Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues. Specially maintain roof slope (1% to 2%) for rain water drainage and other durability and maintenance requirements as per alliance standard section 8.26.	
Suggested Deadline Date:	30 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 rebound hammer test has been conducted to measure concrete compressive strength. Further testing should be completed to validate the in-situ compressive strengths.	
Source of Findings:	Visual Assessment: visit on 1st 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 and take appropriate remedial measures. This assessment should include a validation of in-situ concrete comprehensive strengths via destructive core testing.	
Suggested Deadline Date:	30 Jun 2014	
Standard:	Reference Alliance Standards Part 7 Building Materials Section 7.2 Masonry-chip aggregate concrete (MCAC)	
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:	3	
Description:	The accessories and fabric storage racks, exhaust fans in both buildings are not adequately anchored and braced to resist earthquake forces.	
Source of Findings:	Visual Assessment: visit 1st 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:	30 Jun 2014	
Standard:	Alliance Standards Part 8 Section 8.18 Seismic Bracing of Key Non-Structural Elements and 2006 BNBC Part 6	
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:	1	

Description:	Roof slab and extended column of building no.2 constructed with MCAC are exposed to rainfall or other sources of water sealed with a protective coating to prevent water intrusion.	
Source of Findings:	Photograph: Photo of unsealed roof slab for building 2., Visual Assessment: 1st 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:	30 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:	1	
Description:	There is a vertical corrosion stain due to leakage at roof in the structural steel member of 3-storied building are shown in photos.	
Source of Findings:	Photograph: photos taken during visit on 1st 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:	30 Jun 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:	3	
Description:	There is cracking in the expansion joint material for the 3-storied Building (B1).	
Source of Findings:	Photograph: Photo of expansion joint cracking., Visual Assessment: visit on 1st Aptil 2014.	
Suggested Plan of Action:	Remove deteriorated expansion joint material and provide new approved material at the expansion joint.	
Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.26 Durability and Maintenance	

Structural Safety Programs		
Question:	Are floor loads in compliance with posted plans?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	Floor load plans not posted.	
Source of Findings:	Visual Assessment: visit on 1st April 2014.	
Suggested Plan of Action:	Redistribute floor loads to comply with the Floor Loading Plans.	
Suggested Deadline Date:	30 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.10 Floor Loading Plans (Load Plans).	
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 1st 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:	30 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 not been 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 1st April 2014.	
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:	30 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 posted.	
Source of Findings:	Visual Assessment: visit on 1st April 2014.	
Suggested Plan of Action:	Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Floor load plans should be visibly posted on all levels of each building.	
Suggested Deadline Date:	30 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 1st 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:	30 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 1st 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 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:	30 Jun 2014	
Standard:	Alliance Standards Part 8 Section 8.9 Factory Load Manager	