INITIAL STRUCTURAL INTEGRITY ASSESSMENT REPORT (SIAR)

Factory Name:	**GLOBAL SHIRTS LIMITED**
Address:	**49 (NP) Kalurghat Heavy Industrial Area Kalurghat, Chittagong Chittagong Chittagong Bangladesh**
Assessor:	**Sumerra**
Date:	**11 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:	GLOBAL SHIRTS LIMITED
Address:	49 (NP) Kalurghat Heavy Industrial Area Kalurghat, Chittagong Chittagong Chittagong Bangladesh
Country:	Bangladesh
Province:	Chittagong
City:	Chittagong
Zip Code:	
Audit Duration:	2 Days
Re-Audit:	Re-Audit After 0 Months
Draft Report Date :	July 4, 2014
Final Report Date :	September 29, 2014
Are all Action Items From Previous Assessment Completed?:	N/A
Buildings in Complex :	1
Number of Building Levels (Stories) :	Block A -8 storied & Block B-10 storied
Approximate Building Area (SF) :	68288 sf
Date of Building Construction :	1980
Date of Last Building Renovation/Addition :	2006 - 2013 (5 levels added)
Is the Building mixed use?:	No
Ancillary Structures in Complex :	2
Number of Ancillary Levels (Stories) :	1 each
Approximate Ancillary	3100 sf

Structures Area (SF) :	
Number of Occupants :	Approx. 8000
Exterior Facade Description :	5" brick infill wall with windows (glass & steel)
Structural System Description :	RCC frame (Column & Beam) structure with monolithic 5" slab and 5" brick wall .
Issues were not found during the structural integrity assessment that required the Emergency Escalation Protocol (and referral to NTC Review Panel)?:	Yes

ASSESSMENT FINDINGS

Structural System Design		
Question:	Are the available FoS for the columns adequate based on Preliminary calculation?	
Priority Level:	High	
Non-Compliance Level:	3	
Description:	FoS of the columns (based on live load of 42 psf, based on concrete strength of 2370 per the Alliance Standard minimum for SCAC) are not adequate based on preliminary calculations. 42psf: Central = 1.29 Corner = 2.98 Edge = 1.48 20psf: Central = 1.48 Corner = 3.19 Edge = 1.65 FoS of 1.25 to 1.5 indicates an inadequate safety margin.	
Source of Findings:	Uploaded Document: Stress Calculation	
Suggested Plan of Action:	Engage a qualified structural engineer to conduct a detailed engineering assessment (DEA) of the building within 6 weeks. DEA should include assessment of the strength of the concrete and quantity of the steel in the columns. Concrete strength shall be assessed by taking at least four 4 inch diameter cores from the area of concern. If cores are to be taken from columns, it is advisable to take it from an upper level where the stresses are low (for practical reasons 3 inch cores may be taken from columns). In addition, UPV shall be used to determine concrete strength in a sufficient number of columns in the lower tiers so that a level of confidence is achieved. The calibrated results of core tests and UPV shall be used to determine a reliable value of concrete strength in the columns. The size and diameter of steel rebar in most of the columns of two lowest tiers shall be authentically determined using a Ferro scanner or similar device. In order to confirm the diameter of embedded bars as obtained from Ferro scanner, the Assessor may have to remove the concrete cover in one or two locations.	
Suggested Deadline Date:	15 Aug 2014	
Standard:	Provide results of preliminary calculations in space provided. a) column capacity; FoS > 1.86 - Safe b) column capacity; FoS 1.5 -1.86 - Needs Evaluation c) Column capacity; FoS 1.25-1.5 - Needs Evaluation d) Column capacity; FoS <1.25 - Unsafe In case of a critically low FoS (<1.25), consider Immediate Escalation Protocol	
Question:	Are credible structural design documents available for review and kept on site?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	Complete original structural design documents or as-built documents were not available for review.	
Source of Findings:	Document Review: No design documents available for review	

Suggested Plan of Action:	Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.	
Suggested Deadline Date:	15 Aug 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:	As noted elsewhere, no design report was available and therefore no determination could be made regarding general conformance with the 2006 BNBC or other comparable applicable international model building code.	
Source of Findings:	Document Review: No design documents available for review	
Suggested Plan of Action:	Engage a qualified structural engineer to develop the required documents to confirm compliance with building code. Documents must comply with Alliance Standard Part 8 Section 8.19 and 8.20	
Suggested Deadline Date:	15 Aug 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:	As noted elsewhere, no design report was available and therefore no determination could be made regarding general conformance with seismic and wind requirements.	
Source of Findings:	Document Review: No design documents available for review	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm satisfactory conformance to seismic and wind requirements of BNBC.	
Suggested Deadline Date:	15 Aug 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:	As noted elsewhere, no design report was available and therefore no determination could be made regarding general conformance 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: No design documents available for review	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading. 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	
Suggested Deadline Date:	15 Aug 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:	Management had approved drawings for the 5th floor extension which include a plan, elevation & foundation plan. However, the super-structural or sub-structure impact analysis reports were not present.	
Source of Findings:	Document Review: No super structure or sub structure analyis report avilable.	
Suggested Plan of Action:	Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.	
Suggested Deadline Date:	15 Aug 2014	
Standard:	Reference Alliance Standards Part 8 Section 8.1 Applicability of Building Code.	

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:	Factory has several areas of potentially high loading (fabric storage on 6th floor-west, 1st floor-west, and 1st floor-B block northeast) and no design report indicating the sufficient load capacity exists.	
Source of Findings:	Photograph: Fabric Storage	
Suggested Plan of Action:	Have a qualified structural engineer confirm that capacity to support the noted storage load is available. Load Plans complying with Alliance Standard Part 8 Section 8.20.4.3 should also be developed.	
Suggested Deadline Date:	15 Aug 2014	
Standard:	Alliance Standards Part 8 Section 8.15 Minimum Floor Design Loads	
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:	Since no credible design documents were available, it is unknown if provisions for load due to the RCC water tank at the 7th floor are sufficient.	
Source of Findings:	Photograph: RCC water tank on roof	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate concentrated loads of the overhead water tank. If provisions have not been made, have a qualified structural engineer develop a remediation plan or it may be necessary to remove the rooftop tower.	
Suggested Deadline Date:	15 Aug 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:	3	

Description:	Management did not have any certificate of occupancy available for review.	
Source of Findings:	Document Review: No credible occupancy certificates available for review	
Suggested Plan of Action:	Provide Certificates of Occupancy for review.	
Suggested Deadline Date:	15 Aug 2014	
Standard:	Alliance Standard Part 8 Section 8.3 Preliminary Structural Assessment	
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:	2	
Description:	Corrosion observed on the metal roof deck at the generator building	
Source of Findings:	Photograph: Photo of corroded roof	
Suggested Plan of Action:	Repair or replace corroded roof material. New or repaired roof should be appropriately coated/sealed to prevent corrosion	
Suggested Deadline Date:	15 Aug 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:	Storage racks observed on 6th floor-west, 1st Floor-northwest, and GF-west are not achored to resist earthquake forces.	
Source of Findings:	Photograph: Storage racks	
Suggested Plan of Action:	Adequately anchor and brace all non-structural elements such as the storage rack systems to resist earthquake forces to comply with the BNBC and Alliance Standard.	
Suggested Deadline Date:	15 Aug 2014	
Standard:	Alliance Standards Part 8 Section 8.18 Seismic Bracing of Key Non-Structural Elements and 2006 BNBC Part 6	

Question:	Is the building free of active signs of water intrusion or ponding due to lack of performance of the façade system?
Priority Level:	Low
Non-Compliance Level:	2
Description:	Water ponding was observed on the roof. Consequently, water staining was observed on 7th floor ceiling and is likely due to moisture intrustion through the slab.
Source of Findings:	Photograph: Photo of water ponding Photo of water staining on 7th floor
Suggested Plan of Action:	Install positive drainage slope on the roof of at least 2% with drains and downspouts at low spots to prevent ponding or seal top roof and maintain protective coating.
Suggested Deadline Date:	28 Sep 2014
Standard:	Alliance Standard Part 8 Section 8.26 Durability and Maintenance

Question:	Was masonry-chip aggregate concrete (MCAC) used in the construction of the building?
Priority Level:	
Non-Compliance Level:	
Description:	
Source of Findings:	
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.
Suggested Deadline Date:	
Standard:	Reference Alliance Standards Part 7 Building Materials Section 7.2 Masonry-chip aggregate concrete (MCAC)

Structural Safety Programs

Question:	Are floor loads in compliance with posted plans?
Priority Level:	Medium
Non-Compliance Level:	3
Description:	No floor load plans posted as required
Source of Findings:	Document Review: No load plans Displayed
Suggested Plan of	Have a qualified structural engineer prepare load plans including the

Action:	information required in Section 8.20 of the Alliance Standard.	
Suggested Deadline Date:	30 Sep 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:	No program is currently 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:	Document Review: No program available for review	
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 Aug 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: No load plans available for review	
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:	15 Aug 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 as required	

Source of Findings:	Document Review: No load plans Displayed	
Suggested Plan of Action:	Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard.	
Suggested Deadline Date:	15 Aug 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	
Source of Findings:	Document Review: No load plans available for review	
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 (noted elsewhere).	
Suggested Deadline Date:	15 Aug 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 factory load manager has been designated.	
Source of Findings:	Worker Interviews: Management confirms no Factory Load Manager	
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:	31 Jul 2014	
Standard:	Alliance Standards Part 8 Section 8.9 Factory Load Manager	