INITIAL STRUCTURAL INTEGRITY ASSESSMENT REPORT (SIAR)

Factory Name:	**Knit & Knitex (PVT) Ltd**
Address:	**Soydana, Dagerchala Road, National University, Joydebpur, Gazipur Joydebpur, Gazipur Dhaka Bangladesh**
Assessor:	**Bureau Veritas**
Date:	**24 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:	Knit & Knitex (PVT) Ltd
Address:	Soydana, Dagerchala Road, National University, Joydebpur, Gazipur Joydebpur, Gazipur Dhaka Bangladesh
Country:	Bangladesh
Province:	Dhaka
City:	Joydebpur, Gazipur
Zip Code:	
Audit Duration:	01 Days
Re-Audit:	Re-Audit After 0 Months
Draft Report Date :	06-01-2014
Final Report Date :	10-22-2014
Are all Action Items From Previous Assessment Completed?:	N/A
Buildings in Complex :	There are six buildings in the factory premises where one is a six story main building and the rest are ancillary buildings. The buildings are labeled as follows: 1) Six storey main building, 2) Single storey generator shed, 3) Single storey dining and Medical shed, 4) Single storey boiler shed, 5) Single storey waste storage, 6) Single storey kitchen shed.
Number of Building Levels (Stories) :	1) Six storey main building: Stories above grade: 6, Stories below grade: 0, 2) Single storey generator shed: Stories above grade: 1, Stories below grade: 0, 3) Single storey dining and medical shed: Stories above grade: 1, Stories below grade: 0, 4) Single storey boiler shed: Stories above grade: 1, 5) Single storey wastage store: Stories above grade: 1, Stories below grade: 0, 6) Single storey Kitchen shed: Stories above grade: 1, Stories below grade: 0.
Approximate Building Area (SF) :	Total area of buildings in the factory premises: 67963.32 sft. + 11000 sft (Roof area) = 78963.32 sft.(Including roof square footage).Building-wise breakdown as follows: 1) Six story main building: 77000 sft, 2) Single story generator shed: 528.00 sft, 3) Single story dining and Medical shed: 1198.81 sft, 4) Single story boiler Shed: 86.51 sft, 5) Single story wastage store: 100sft, 6) Single story Kitchen shed: 50 sft.
Date of Building Construction :	Factory personnel informed the date of construction as follows: 1) Six story main building: Ground floor to 4th floor finished in: December-2009. Rest of the stories are under construction.
Date of Last Building Renovation/Addition :	No record for date of renovation or addition was found from factory personnel.
Is the Building mixed use?:	No

Ancillary Structures in Complex :	1) Single story generator shed: Stories above grade: 1, Stories below grade: 0, 2) Single story dining and Medical shed: Stories above grade: 1, Stories below grade: 0, 3) Single story boiler Shed: Stories above grade: 1, Stories below grade: 0, 4) Single story wastage store: Stories above grade: 1, Stories below grade: 0, 5) Single story Kitchen shed: Stories above grade: 1, Stories below grade: 0.
Number of Ancillary Levels (Stories) :	1) Single story generator shed 2) Single story dining and Medical shed 3) Single story boiler Shed 4) Single story wastage store 5) Single story Kitchen shed
Approximate Ancillary Structures Area (SF) :	1) Single story generator shed: 528.00 sft, 2) Single story dining and Medical shed: 1198.81 sft, 3) Single story boiler Shed: 86.51 sft, 4) Single story wastage store: 100 sft, 5) Single story Kitchen shed: 50 sft.
Number of Occupants :	Total number of occupants: 923. 1) Six story main building: (Ground floor: 140, 1st floor: 220, 2nd floor: 80, 3rd floor: 220, 4th floor: 260, 5th floor: Under construction), 2) Single story generator shed: 1, 3) Single story dining and Medical shed: 1, 4) Single story boiler Shed: 1, 5) Single story wastage store: 0, 6) Single story Kitchen shed: 0.
Exterior Facade Description :	The building is RCC column supported by flat plate system structure with in-filled masonry. The windows are aluminum frame sliders. The main door is a metallic slider. There is an enclosed ladder anchored adequately at the front side of the building.
Structural System Description :	The building is a RCC column structure supported by flat plate system. Isolated column footings are used for the foundation.

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 in the main building are adequate based on the preliminary calculation. FoS are listed as follows based on NDT value: Central column:2.07 corner column:2.93 edge column:1.60 FoS are listed as follows based on Alliance minimum value: Central column:1.77 corner column:2.52 edge column:1.39	
Source of Findings:	Uploaded Document: Column Stress Calculation Sheet	
Suggested Plan of Action:	Under guidance from a qualified structural engineer arrange Detail Engineering Assessment of the structure. This assessment should be conducted within 6 weeks and include destructive core testing to validate the in-situ concrete compressive strength of structural elements.	
Suggested Deadline Date:	15 Nov 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:	Is a clear and redundant load path to resist lateral loads provided?	
Priority Level:	Medium	
Non-Compliance Level:	3	
Description:	The structure is a flat plate system and hence the lateral load system is not apparent and the redundancy is not known.	
Source of Findings:	Document Review: Confirmed by reviewing documents. , Visual Assessment: Confirmed visually.	
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:	15 Jul 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:	Are credible structural design documents available for review and kept on site?	
Priority Level:	Medium	
Non-Compliance Level:	2	
Description:	A set of design documents is available onsite for review. However, the design report is not available which is required as per BNBC 2006, Clause 1.9.1.1.	
Source of Findings:	Document Review: Document pertaining to the relevant information unavailable.	
Suggested Plan of Action:	Have a qualified structural engineer to prepare credible design report documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.	
Suggested Deadline Date:	15 Jul 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:	2	
Description:	The building is designed and constructed after 2006 but there is no indication that the design accommodates the requirement of BNBC 2006. The design document does not clearly demonstrate the conformance with any applicable model building code.	
Source of Findings:	Document Review: Doucument unavailable.	
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 Jul 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:	2	
Description:	The building is constructed after 2006. However, there is no indication that the building have been designed taking into consideration the seismic and wind	

	load.
Source of Findings:	Document Review: Confirmed by reviewing documents.
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 Jul 2014
Standard:	Alliance Standards Part 8 Section 8.17 Design for Lateral Loads and 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:	2
Description:	There is one water plastic tank with a capacity of 2000 liters and eight plastic water tanks with a capacity of 1000 liters each on the roof top of the building. There is no analytical information pertaining to the provision of these tanks in the design.
Source of Findings:	Document Review: Document unavailable., Visual Assessment: Confirmed visually.
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 Jul 2014
Standard:	Alliance Standard Part 8 Section 8.13 and 8.14
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:	1
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 pertaining to the relevant information unavailable.
Suggested Plan of Action:	Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.

Suggested Deadline Date:	15 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:	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:	1	
Description:	The estimated floor load exceeds 42 psf (estimated load is 66 psf at fifth floor in one panel near the stair). There is no analytical confirmation available for such load being accommodated in the design of the structure.	
Source of Findings:	Visual Assessment: Confirmed visually.	
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:	17 Nov 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:	1	
Description:	Certificates of Occupancy were not available for review.	
Source of Findings:	Document Review: Document unavailable.	
Suggested Plan of Action:	Provide Certificates of Occupancy for review.	
Suggested Deadline Date:	15 Jul 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:	Dampness has been observed beside the toilet and stair wall. Standing water was also found on the rooftop of the building.
Source of Findings:	Visual Assessment: Confirmed visually.
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 Jul 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:	2
Description:	The structural members constructed with MCAC have not been investigated by an appropriate program of in-situ testing and representative destructive testing or core samples. The column stresses were calculated using the minimum strength of concrete specified by the standard and the strength retrieved from the NDT test results. For both concrete strengths the columns are over-stressed.
Source of Findings:	Document Review: Document unavailable., Uploaded Document: Column Stress Calculation Sheet, Visual Assessment: Confirmed visually.

Suggested Plan of Action:	As part of the detailed assessment outlined elsewhere, conduct destructive core testing to validate the in-situ concrete compressive strength of structural elements.	
Suggested Deadline Date:	15 Nov 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:	2	
Description:	The roof of the building is of MCAC but no protective sealing is available.	
Source of Findings:	Visual Assessment: Confirmed visually.	
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. Otherwise, provide 2% slope on the exposed surface to prevent accumulation of water.	
Suggested Deadline Date:	15 Jul 2014	
Standard:	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:	1	
Description:	There are nine plastic water tanks on the rooftop at considerable height, which are not braced or anchored adequately.	
Source of Findings:	Visual Assessment: Confirmed visually.	
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:	15 Jul 2014	
Standard:	Alliance Standards Part 8 Section 8.18 Seismic Bracing of Key Non-Structural Elements and 2006 BNBC Part 6	

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 designated load in each floor will not be exceeded.	
Source of Findings:	Document Review: Document review shows that no such program in place.	
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 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: Confirmed visually.	
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 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:	There is no load plan available showing the actual maximum operational loading that is allowable.	
Source of Findings:	Visual Assessment: Confirmed visually.	
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:	15 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 marking on the floor to designate spaces and height for storage of work materials.	
Source of Findings:	Visual Assessment: Confirmed visually.	
Suggested Plan of Action:	Have a qualified structural engineer prepare a load plan for each floor and have the floors marked for designating storage area as per the developed load plan.	
Suggested Deadline Date:	15 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:	2	
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: Confirmed by reviewing documents.	
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:	15 Jul 2014	
Standard:	Alliance Standards Part 8 Section 8.9 Factory Load Manager	