INITIAL STRUCTURAL INTEGRITY ASSESSMENT REPORT (SIAR)

Factory Name:	**MAHDEEN SWEATERS LTD**
Address:	**Jamirdia, Valuka, Mymensingh Mymensingh Dhaka Bangladesh**
Assessor:	**Bureau Veritas**
Date:	**09 Jun 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:	MAHDEEN SWEATERS LTD
Address:	Jamirdia, Valuka, Mymensingh Mymensingh Dhaka Bangladesh
Country:	Bangladesh
Province:	Dhaka
City:	Mymensingh
Zip Code:	2240
Audit Duration:	1 Days
Re-Audit:	Re-Audit After 0 Months
Draft Report Date :	09 Jun, 2014
Final Report Date :	22 Oct, 2014
Are all Action Items From Previous Assessment Completed?:	N/A
Buildings in Complex :	There are 9 buildings in the factory premises out of which one is main production building and eight are ancillary buildings. The buildings are named as: 1) Six story RCC main production building, 2) Single story utility shed, 3) Single story pump shed, 4) Single story sub-station shed, 5) Single story waste storage shed, 6) Single story ETP shed, 7) Single story dining, child care and medical shed, 8) Single story security shed, 9) Single story RMS (Gas Meter) shed.
Number of Building Levels (Stories) :	1) Six story RCC main production building: Stories above grade: 5 (5th floor is under construction), Stories below grade: 0, 2) Single story utility shed: Stories above grade: 1, Stories below grade: 0, 3) Single story pump shed: Stories above grade: 1, Stories below grade: 0, 4) Single story sub-station shed: Stories above grade: 1, Stories below grade: 0, 5) Single story waste storage shed: Stories above grade: 1, Stories below grade: 0, 6) Single story ETP shed: Stories above grade: 1, Stories below grade: 0, 7) Single story dining, child care and medical shed: Stories above grade: 1, Stories below grade: 0, 8) Single story security shed: Stories above grade: 1, Stories below grade: 0, 9) Single story RMS (Gas Meter) shed: Stories above grade: 1, Stories below grade: 0,
Approximate Building Area (SF) :	Total area of all buildings in the factory premises: 359991 sft. Building wise breakdown is as follows: 1) Six story RCC main production building: 346432.00 sft (Ground floor: 47776.00 sft, 1st floor: 49776.00 sft, 2nd floor: 49776.00 sft, 3rd floor: 49776.00 sft, 4th floor: 49776.00 sft, 5th floor: 49776.00 sft Roof : 49776.00 sft) 2) Single story utility shed: 700.00 sft, 3) Single story pump shed: 200.00 sft, 4) Single story sub-station shed: 200.00 sft, 5) Single story waste storage shed: 1500.00 sft, 6) Single story ETP shed: 900.00 sft, 7) Single story dining, child care and medical shed: 9000.00 sft, 8) Single story security shed: 855.00 sft, 9) Single story RMS (Gas Meter) shed: 204.00 sft.
Date of Building	Factory personnel informed the date of construction as follows: Construction finished in April-2004 (All

Construction :	buildings).
Date of Last Building Renovation/Addition :	Factory personnel informed the date of last building renovation as follows: 1) Six story RCC main production building: Construction ongoing at 5th floor.
Is the Building mixed use?:	No
Ancillary Structures in Complex :	1) Single story utility shed, 2) Single story pump shed, 3) Single story sub-station shed, 4) Single story waste storage shed, 5) Single story ETP shed, 6) Single story dining, child care and medical shed, 7) Single story security shed, 8) Single story RMS (Gas Meter) shed.
Number of Ancillary Levels (Stories) :	1) Single story utility shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 2) Single story pump shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 3) Single story sub-station shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 4) Single story waste storage shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 5) Single story ETP shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 6) Single story dining, child care and medical shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 7) Single story security shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1, 8) Single story RMS (Gas Meter) shed: Stories above grade: 1, Stories below grade: 0, Occupied levels: 1
Approximate Ancillary Structures Area (SF) :	1) Single story utility shed: 700.00 sft, 2) Single story pump shed: 200.00 sft, 3) Single story sub-station shed: 200.00 sft, 4) Single story waste storage shed: 1500.00 sft, 5) Single story ETP shed: 900.00 sft, 6) Single story dining, child care and medical shed: 9000.00 sft, 7) Single story security shed: 855.00 sft, 8) Single story RMS (Gas Meter) shed: 204.00 sft.
Number of Occupants :	Total number of occupants: 3612. 1) Six story RCC main production building: 3586 (Ground floor: 888, 1st floor: 870, 2nd floor: 833, 3rd floor: 995, 4th floor (Finishing work is going on & being used as finished goods store): 0, 5th floor (under construction): 0), 2) Single story utility shed: 3, 3) Single story pump shed: 1, 4) Single story sub-station shed: 0, 5) Single story waste storage shed: 0, 6) Single story ETP shed: 1, 7) Single story dining, child care and medical shed: 16, 8) Single story security shed: 5, 9) Single story RMS (Gas Meter) shed: 0.
Exterior Facade Description :	The exterior of the building is of infilled brick wall in frame of the structure. The doors are wooden and windows are of glass in aluminum frame. The overall condition of the façade is good without any crack and defect.
Structural System Description :	This building is pre-stressed flat slab system with edge beam except storage portion which is moment resisting framing system. Foundation is isolated footing and the structure is regular framing.

ASSESSMENT FINDINGS

Structural System Design		
Question:	Are the available FoS for the columns adequate based on Preliminary calculation?	
Priority Level:	High	
Non-Compliance Level:	2	
Description:	Column FoS calculation was done for both considering the value of NDT (UPV test) and minimum. 1) FoS of columns considering the value of NDT (UPC Test-3500 psi): Central Column:2.05, Corner Column:2.67, Edge Column:2.07, 2) FoS of columns considering the value of minimum (2370 psi): Central Column:1.58, Corner Column:2.14, Edge Column:1.64, FoS of central and edge column are below the acceptable limit (1.86) for minimum concrete compressive strength.	
Source of Findings:	Uploaded Document: FoS calculation spreadsheet	
Suggested Plan of Action:	Under guidance from a qualified structural engineer arrange Detail Engineering Assessment of the structure. This assessment should include destructive core testing to validate the in-situ concrete compressive strength of structural elements.	
Suggested Deadline Date:	01 Dec 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:	2	
Description:	A set of structural documents are available for this building. However, the design report is not available which is required as per BNBC 2006 clause 1.9.1.1.	
Source of Findings:	Document Review: Documents reviewed on site.	
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:	03 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:	2	
Description:	The building was designed before 2006 but construction is ongoing. No analytical confirmation indicating general conformance with any code is available.	
Source of Findings:	Document Review: Documents reviewed 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:	03 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:	2	
Description:	The building was designed before 2006 but construction is ongoing. No analytical confirmation regarding the consideration of the requirement of seismic and wind loading in the design of the building is available.	
Source of Findings:	Document Review: Documents reviewed on site.	
Suggested Plan of Action:	Engage a qualified structural engineer and assess the building against seismic and wind load conditions and if there are any deficiency, make the remediation accordingly.	
Suggested Deadline Date:	03 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:	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: Documents reviewed on site.	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading and storm surge.	
Suggested Deadline Date:	03 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:	Is a clear and redundant load path to resist lateral loads provided?	
Priority Level:	Medium	
Non-Compliance Level:	2	
Description:	The structure is a flat slab system and hence the lateral load system is not apparent and the redundancy is not known.	
Source of Findings:	Document Review: Documents reviewed on site., Visual Assessment: Visual inspection conducted.	
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:	03 Aug 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:	2	
Description:	There are twelve plastic overhead water tanks on the roof of Building. Capacity of each water tanks is 2000 liters. There is no analytical information on the provision of these tanks in the design.	
Source of Findings:	Document Review: Documents reviewed on site., Visual Assessment: Visual inspection conducted.	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm and document that provisions have been made to accommodate these water tanks. If provisions have not	

	been made, have a qualified structural engineer develop a remediation plan.	
Suggested Deadline Date:	03 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:	1	
Description:	Occupancy certificate is not available at site for review.	
Source of Findings:	Document Review: Documents reviewed on site.	
Suggested Plan of Action:	Apply for issuance of Certificate of Occupancy and pursue the matter to obtain the same.	
Suggested Deadline Date:	03 Aug 2014	
Standard:	Alliance Standard Part 8 Section 8.3 Preliminary Structural Assessment	
Structural System Construction		
Question:	If the building is currently being renovated or expanded, are the Construction Practices and Safety requirements of Section 9 being followed?	
Priority Level:	Medium	
Non-Compliance Level:	2	
Description:	The building is being extended vertically as per approved structural design. However, the safety requirements are not adequately addressed. For example: 1) Safety nets are not used. 2) Workers did not wear safety shoes, safety caps.	
Source of Findings:	Visual Assessment: Visual inspection conducted.	
Suggested Plan of Action:	The management should ensure that the construction practices and safety being adhered to as per BNBC 2006, part 7 and alliance standard, section 9.	
Suggested Deadline Date:	03 Aug 2014	
Standard:	Alliance Standard Part 9 Construction Practices and Safety.	

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:	1	
Description:	There is standing water on rooftop. There is no maintenance program for all areas, including areas with efflorescence, dampness, standing water on rooftops, and corrosion.	
Source of Findings:	Document Review: Documents reviewed on site., Visual Assessment: Visual inspection conducted.	
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:	03 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:	1	
Description:	In the store room, there are racks which are not braced for earthquake force. Also, there are 12 plastic water tanks with considerable height, which are not braced adequately to resist earthquake forces.	
Source of Findings:	Visual Assessment: Visual inspection conducted.	
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 Sep 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: Documents reviewed 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:	03 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:	There is no load plan available showing the actual maximum operational loading that is allowable.	
Source of Findings:	Document Review: Documents reviewed 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:	03 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:	Floor load plans are not posted.	
Source of Findings:	Visual Assessment: Visual Inspection: Visual inspection of the factory does not show floor load plans being posted at each floor.	
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. Floor load plans should be visibly posted on all levels of all buildings.	
Suggested Deadline Date:	03 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:	In the storage area there is no clear marking to indicate the acceptable loading limits as described in the Load Plan for that floor.	
Source of Findings:	Visual Assessment: Visual inspection conducted.	
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:	03 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:	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: Documents reviewed 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:	03 Aug 2014	
Standard:	Alliance Standards Part 8 Section 8.9 Factory Load Manager	