INITIAL STRUCTURAL INTEGRITY ASSESSMENT REPORT (SIAR)

Factory Name:	**Hemple Rhee Mfg Co (BD) Ltd**
Address:	**Plot # 23-24, Sector # 06 Chittagong Export Processing Zone Chittagong Export Processing Zone Chittagong Chittagong Bangladesh**
Assessor:	**EIMS**
Date:	**23 Mar 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:	Hemple Rhee Mfg Co (BD) Ltd
Address:	Plot # 23-24, Sector # 06 Chittagong Export Processing Zone Chittagong Export Processing Zone Chittagong Chittagong Bangladesh
Country:	Bangladesh
Province:	Chittagong
City:	Chittagong
Zip Code:	4100
Audit Duration:	2 Days
Re-Audit:	Re-Audit After 0 Months
Draft Report Date :	08 April 2014
Final Report Date :	13 May 2014
Are all Action Items From Previous Assessment Completed?:	No
Buildings in Complex :	one
Number of Building Levels (Stories) :	four
Approximate Building Area (SF) :	22,500 sft per floor from GF to Roof,Total floor area 90,000 sft
Date of Building Construction :	Initially one story (GF to 1F) was built from 1995-1997 and other stories from 2002-2003
Date of Last Building Renovation/Addition :	2003
Is the Building mixed use?:	No
Ancillary Structures in Complex :	No
Number of Ancillary Levels (Stories) :	Not Applicable

Approximate Ancillary Structures Area (SF) :	Not Applicable
Number of Occupants :	1895
Exterior Facade Description :	10 inch brick masonry wall both side plastered without reinforcement in facade wall, 45 glass window, open space and road in front of building
Structural System Description :	RC frame structure (beam-column) in first two floor and steel structure in other two floors

ASSESSMENT FINDINGS

Structural System Design		
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:	Fabric was stored on third floor in racks. So concentrated load was applied on the floor due to storage on racks.	
Source of Findings:	Visual Assessment: Photograph of concentrated load in rack due to storage	
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:	18 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:	In third floor live load was found 150 psf due to high storage.	
Source of Findings:	Visual Assessment: Photograph of high loading due to storage	
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:	04 Jun 2014	
Standard:	Alliance Standards Part 8 Section 8.15 Minimum Floor Design Loads	
Question:	Are credible structural design documents available for review and kept on site?	
Priority Level:	Medium	

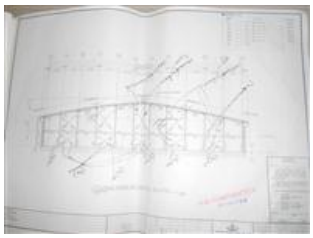
Non-Compliance Level:	2
Description:	The Structural design documents for steel part were available on site and it was credible. But the as built drawings of RCC portion supplied to us was not credible.
Source of Findings:	Document Review: As built drawing of RCC portion Structural drawing of steel portion
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:	18 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:	2
Description:	Supplied drawing did not indicate code conformance.
Source of Findings:	Document Review: As built drawing
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:	18 Jun 2014
Standard:	Reference Alliance Standards Part 8 Section 8.2 Structural Integrity of Existing Factory Buildings
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:	The drawing did not indicate any wind or storm surge loading parameters.
Source of Findings:	Document Review: As built drawing of RCC portion and Structural drawing of steel portion
Suggested Plan of Action:	Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.

Suggested Deadline Date:	18 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:	2	
Description:	Steel portion of the building was designed by "Tantan Structure Co. Ltd.". But we did not receive any document regarding the impact of steel structure on the RCC portion of the existing building.	
Source of Findings:	Document Review: Structural drawing of steel structure	
Suggested Plan of Action:	Have a qualified structural engineer complete an analytical evaluation of the structural impact of the addition.	
Suggested Deadline Date:	18 Jun 2014	
Standard:	Reference Alliance Standards Part 8 Section 8.1 Applicability of Building Code.	
Question:	Results of ferro-scanning for confirmation of steel rebar in the columns of the lowest tier were satisfactory.	
Priority Level:	Medium	
Non-Compliance Level:	2	
Description:	The team measured no. of bars in beams and columns using Bar-detector at different story levels. But reinforcement detail was not available in the drawing of 1st two floors (RCC portion). Almost all drawings were similar to the provided steel structure portion (upper two floor).	
Source of Findings:	Visual Assessment: Photograph of scanning of column using bar detector	
Suggested Plan of Action:	Engage a qualified structural engineer to develop the required documents such as proper as built drawing 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:	18 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.3 Preliminary Structural Assessment	
Question:	Are Certificates of Occupancy available for review?	

Priority Level:	Low	
Non-Compliance Level:	2	
Description:	Certificates of occupancy are not available.	
Source of Findings:	Document Review: No certificates available	
Suggested Plan of Action:	Provide Certificates of Occupancy for review.	
Suggested Deadline Date:	18 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.3 Preliminary Structural Assessment	
Structural System Construction		
Question:	Is the structural system free of deflections (sagging), rotations (twisting), perceivable vibrations, or other noticeable movements of the structure?	
Priority Level:	High	
Non-Compliance Level:	3	
Description:	Third floor vibrates significantly, which is perceivable while walking.	
Source of Findings:	Visual Assessment: Site visit on March 23,2014	
Suggested Plan of Action:	Have a qualified structural engineer provide further analysis and investigation of the structural deficiencies. Structural engineer shall also provide remediation documents if required.	
Suggested Deadline Date:	18 Jun 2014	
Standard:	Reference Alliance Standards Part 8 Structural Design Section 8.2 Structural Integrity of Existing Factory Buildings	
Question:	Is the structural system free of distress, settlement, shifting, or cracking in columns or walls?	
Priority Level:	High	
Non-Compliance Level:	3	
Description:	Crack was found on some exterior columns, among them one crack is significant.	
Source of Findings:	Visual Assessment: Photograph of cracks in exterior column	
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	28 May 2014	

Date:		
Standard:	Alliance Standard Part 8 Section 8.3.3	
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:	2	
Description:	Factor of safety is 1.96, 2.39 and 3.07 for interior, edge and corner column. Slender column, transfer structure and flat plate are not in the buildings. In addition, cracks on deck slab were found on third floor.	
Source of Findings:	Visual Assessment: Photograph of cracks in third floor deck section	
Suggested Plan of Action:	Engage a qualified structural engineer to confirm structural performance of the structure.	
Suggested Deadline Date:	18 Jun 2014	
Standard:	Alliance Standard 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:	In base plate, steel member joint, fire stair and roof slab corrosion was found.	
Source of Findings:	Visual Assessment: Photograph of corrosion in fire stair, steel member joint and base plate	
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:	18 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.26 Durability and Maintenance	

Question:	Are structural steel members free of corrosion, physical damage or other types of deterioration?
Priority Level:	Medium
Non-Compliance Level:	2
Description:	In fire stair and roof slab corrosion was found. Bracing was removed from some exterior wall on steel structure, which was in drawing. Besides, we found some bracings were loose and not properly connected.
Source of Findings:	Document Review: Missing bracing layout plan according to drawing, Visual Assessment: Photograph of corrosion of fire stair Photograph of missing bracing in hole
Suggested Plan of Action:	Complete further testing on areas of deterioration and have a qualified structural engineer develop a remediation plan.
Suggested Deadline Date:	18 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:	2
Description:	Some unbraced racks were found on the ground floor.
Source of Findings:	Visual Assessment: Photograph of unbraced rack
Suggested Plan of Action:	Develop engineered plans to brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard. Install anchor and braces as shown on approved plans.
Suggested Deadline Date:	18 Jun 2014
Standard:	Alliance Standards Part 8 Section 8.18 Seismic Bracing of Key Non-Structural Elements and 2006 BNBC Part 6

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:	1
Description:	During previous assessment by Parfait Associates Ltd, they performed Rebound Hammer Test and they said in their report, concrete strength 3626 psi. But they did not perform any core test.

Source of Findings:	Document Review: Previous assessment by Parfait Associates Ltd
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:	18 Jun 2014
Standard:	Reference Alliance Standards Part 7 Building Materials Section 7.2 Masonry-chip aggregate concrete (MCAC)
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:	2
Description:	There was no program in place to ensure the live loads for which a floor or roof has been designed will not be exceeded. So it is required and it should be marked in all floors including roof.
Source of Findings:	Visual Assessment: Site visit on March 23, 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:	04 Jun 2014
Standard:	Alliance Standard Part 13 Section 13.7 and Part 8 Section 8.9.
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:	Storage areas are required to be marked to indicate acceptable loading limits per the load plans. Huge load was found on third floor.
Source of Findings:	Visual Assessment: Photograph of huge load on third floor
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:	18 Jun 2014
Standard:	Alliance Standard Part 8 Section 8.11 Floor Load Markings

Question:	Are Floor Load Plans posted as required?	
Priority Level:	Low	
Non-Compliance Level:	2	
Description:	No floor load plan were posted in the building.	
Source of Findings:	Visual Assessment: Site visit on March 23, 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.	
Suggested Deadline Date:	18 Jun 2014	
Standard:	Alliance Standard Part 8 Section 8.20.5.3	
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:	No factory load manager was onsite full time. So, a factory load manager is required to check whether the loads exceed or not as per floor load plan.	
Source of Findings:	Visual Assessment: Site visit on March 23, 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:	04 Jun 2014	
Standard:	Alliance Standards Part 8 Section 8.9 Factory Load Manager	
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:	1	
Description:	They have machine load layout plan, but they have not prepared for each floor documenting the actual maximum operational loading that is intended or allowable on each floor.	

Source of Findings:	Document Review: Machine load layout plan
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:	18 Jun 2014
Standard:	Alliance Standard Part 8 Section 8.10 Floor Loading Plans (Load Plans)