INITIAL STRUCTURAL INTEGRITY ASSESSMENT REPORT (SIAR)

Factory Name:	**Rupa Fabrics Ltd**
Address:	**Kunia, Board Bazar, Gazipur Gazipur Dhaka Bangladesh**
Assessor:	**Bureau Veritas**
Date:	**29 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.

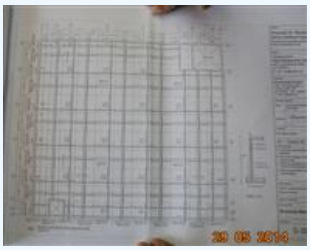
For more information and report feedback please go to: www.bangladeshworkersafety.org.

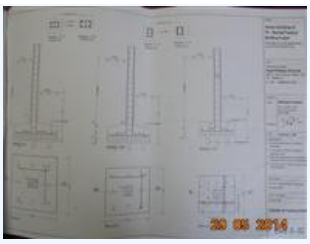
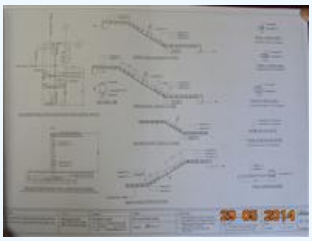
GENERAL INFORMATION

General Information	
Factory Name:	Rupa Fabrics Ltd
Address:	Kunia, Board Bazar, Gazipur Gazipur Dhaka Bangladesh
Country:	Bangladesh
Province:	Dhaka
City:	Gazipur
Zip Code:	1704
Audit Duration:	
Re-Audit:	Re-Audit After 0 Months
Draft Report Date :	June 05, 2014
Final Report Date :	September 16, 2014
Are all Action Items From Previous Assessment Completed?:	N/A
Buildings in Complex :	4 Main Buildings: 1. Main Production Building 2. Production Building 3. Production Building-1 4. Production Building-2
Number of Building Levels (Stories) :	1. Main Production Building: 11 (Basement+Ground+9) 2. Production Building: 4 (Basement+Ground+2) 3. Production Building-1: 3 (Basement+Ground+1) 4. Production Building-2: 2 (Basement+Ground)
Approximate Building Area (SF) :	235,000 Total
Date of Building Construction :	Unknown
Date of Last Building Renovation/Addition :	Unknown
Is the Building mixed use?:	No
Ancillary Structures in Complex :	1. Utility Building 2. C.I Shed-1 3. C.I Shed-2
Number of Ancillary Levels (Stories) :	1 (Ground)

Approximate Ancillary Structures Area (SF) :	12,000 SF total
Number of Occupants :	2,437 Total
Exterior Facade Description :	Building 1: The exterior façade is in filled masonry in between RCC frame with sliding glass windows in aluminium frames. Building 2: The exterior façade is in filled masonry in between RCC frame with sliding glass windows in aluminium frames. Building 3: The exterior façade is in filled masonry in between RCC frame with sliding glass windows in aluminium frames. Building 4: The exterior façade is in filled masonry in between steel frame with sliding glass windows in aluminium frames.
Structural System Description :	Building 1: RCC flat slab system with edge beam Building 2: RCC moment resisting frame system Building 3: RCC moment resisting frame system Building 4: Special structural system (RCC moment resisting frame at basement and pre-engineered steel frame structure above grade)

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:	NDT (UPV testing) was performed for Buildings 1, 2 and 3. Column FoS calculations were performed considering both NDT compressive strength values (2,900 psi for Building 1 and 2,500 psi for Buildings 2 and 3) the Alliance Standard minimum compressive strength value for stone chip aggregate concrete (2,370 psi). 1) FoS results for Building-1 (2900 psi): Central: 2.62, Corner: 2.29, Edge: 1.88. FoS results for Building-1 (2370 psi): Central: 2.29, Corner: 1.98, Edge: 1.64. 2)FoS results for Building-2 (2500 psi): Central: No central column, Corner: 3.52, Edge: 2.67. FoS results for Building-2 (2370 psi): Central: No central column, Corner: 3.39, Edge: 2.58. 3) FoS results for Building-3 (2500 psi): Central: 2.28, Corner: 4.26, Edge: 2.86. FoS results for Building-3 (2370 psi): Central: 2.20, Corner: 4.10, Edge: 2.75. FoS of columns of all building are above the minimum value 1.86 except the edge columns of Building-01 considering the Alliance Standard minimum concrete compressive strength.	
Source of Findings:	Uploaded Document: Column FoS calculations.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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:	Credible structural drawings are available for all buildings except for the steel frame portion of Building 4 (Production Building-2). The structural engineer's	

	IEB membership number is not present in the structural drawing for Building 3. Also, design reports are not available for any of the buildings.	  
Source of Findings:	Photograph: Select structural drawing for each main building.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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 available structural design documents do not clearly demonstrate conformance with any applicable building code.	
Source of Findings:	Document Review: Documents reviewed on-site.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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:	Building-1 was constructed before 2006 and the rest of the buildings were constructed after 2006. However, none of the available structural documents	

	indicate compliance with the seismic and wind design requirements of the BNBC.	
Source of Findings:	Document Review: Documents reviewed on-site.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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:	The available structural documents do not indicate compliance with the wind load design requirements of the BNBC.	
Source of Findings:	Document Review: Documents reviewed on-site.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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:	An undocumented small RCC structure was observed at the top of Building 1 (serving as an "officers dining" area).	
Source of Findings:	Photograph: Undocumented "shed" structure.	
Suggested Plan of Action:		
Suggested Deadline Date:		

Standard:	Reference Alliance Standards Part 8 Section 8.1 Applicability of Building Code.	
Question:	Is a clear and redundant load path to resist lateral loads provided?	   
Priority Level:	Medium	
Non-Compliance Level:	2	
Description:	Building 1: The structural system is a flat plate structure and hence the lateral load path is not apparent and further information (design report) is required to understand the redundancy against lateral loads. Building 2,3,4: The structural system is a moment resisting frame structure and hence the lateral load path is apparent and there is redundancy due to presence of several numbers of bays in both directions.	
Source of Findings:	Photograph: The load path is apparent except for Building 1.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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:	The following concentrated loads were noted without any evidence that the structural impact of each had been considered: Building 1: 4 rooftop water tanks (5000 liter capacity each), Washing machines at ground floor and Knitting machines at first floor. Building 2: Generator at Ground Level. Building 3: Circular knitting machine (3100 kg) at Level 1. Building 4: Dyeing machine at Ground Level.	

Source of Findings:	Photograph: Concentrated loads.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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:	2	
Description:	The estimated floor load was noted to exceed 42 psf at the following locations: Building 3: Ground Level and Level 1 (60 psf). Building 4: Ground Level (100 psf).	
Source of Findings:	Photograph: Heavy floor loading.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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:	2
Description:	No Certificate of Occupancy is available for review.
Source of Findings:	Document Review: Documents reviewed on-site.
Suggested Plan of Action:	
Suggested Deadline Date:	
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:	1
Description:	Dampness was noted in the buildings in the following locations: Building 1: Ceiling of Level 1, walls of Level 9 and ground floor. Building 3: Wall of Level 1. Building 4: Column and beams at the Basement Level.
Source of Findings:	Photograph: Dampness at different building locations.
Suggested Plan of Action:	
Suggested Deadline Date:	
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:	The following elements were noted to not contain adequate bracing or anchorage to resist seismic forces: -Building 1: 4 plastic water tanks at rooftop, storage racks at Level 7.	
Source of Findings:	Photograph: Unbraced and unanchored elements.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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: No documented load management plan.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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:		
Suggested Deadline Date:		
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 have not been posted.	
Source of Findings:	Visual Assessment: Load plans are not posted.	
Suggested Plan of Action:		
Suggested Deadline Date:		

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:	Storage areas have not been marked to indicate acceptable loading limits.	
Source of Findings:	Visual Assessment: No acceptable loading limit markings.	
Suggested Plan of Action:		
Suggested Deadline Date:		
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 who serves as an ongoing vendor resource and monitor of operational factory floor loading.	
Source of Findings:	Document Review: No documented Factory Load Manger.	
Suggested Plan of Action:		
Suggested Deadline Date:		
Standard:	Alliance Standards Part 8 Section 8.9 Factory Load Manager	