Name of the Factory	: **Zisas Fashion Ltd**
Address of the Factory	: 66, East Hazipara, DIT Road Rampura, Dhaka Dhaka Dhaka Bangladesh
Present Status of the Factory	: **Under Operation**
Structural assessment conducted by	: Alliance
Date of Structural Inspection	: 8-April-14
Fire & Electrical assessment conducted by	: Alliance
Date of Fire & Electrical Inspection	: 9-April-14

BASIC INFORMATION:

There are 01 Main building in the factory premises out of which 01 is main production building. The following general information was noted:

i.	Building Usage Type	: Garments Factory.
ii.	Structural System	: 6-storied RCC Main building with tin shed roof.
iii.	Floor System	: Beam supported slab & Column supported flat plate type.
iv.	Floor Area	: 47,750 sft
v.	No. of Stories	: 6-storied RCC Main building with tin shed roof.
vi.	Construction Year	: 1980
vii.	Foundation Type	: Isolated column footing & pile foundation.
viii.	Design Drawings	: Available.
ix.	Soil investigation Report	: Available
x.	Construction Materials	: RCC brick chips.
xi.	Generator	: Unknown

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for Structural, Fire and Electrical Safety comprises of Short Term, Mid Term and Long Term basis are as follows:

The recommendations for Structural Safety corrective actions are:

Immediate : NA

Short Term: (3 Weeks) :

i. 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.

ii. 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 load limits as described on the Floor Load Plans.

Mid Term (6 Weeks) :

i. Under guidance from a qualified structural engineer arrange Detail Structural Assessment of the structure. This assessment should include destructive core testing to validate the in-situ concrete compressive strength of structural elements.
ii. Have a qualified structural engineer carry out a detailed structural assessment to understand the cause of the beam cracking and to identify remedial actions, if necessary.
iii. Have a qualified structural engineer provide further testing and analysis of cracking in walls and provide a remediation plan to correct noted issues.
iv. 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.
v. Have a qualified structural engineer to complete an analytical evaluation of the structural impact of the addition.
vi. 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.
vii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.
viii. 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.
ix. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.
x. Have a qualified structural engineer complete further analysis of the structure and develop a remediation plan if required.
xi. Have the structural engineer of record provide a design report. This design report should summarize all of the design criteria used in the original design of the building and should conform to the requirements of the BNBC. Alternatively, Have a qualified structural engineer prepare credible as-built documents based on the requirements of Part 8 Section 8.19 of the Alliance Standard.
xii. "Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
xiii. As part of the detailed assessment outlined elsewhere, conduct destructive core testing to validate the in-situ concrete compressive strength of structural elements.
xiv. Have a qualified structural engineer develop Floor Loading Plans per the requirements of Part 8 Section 8.20.5.3.
xv. Have a qualified structural engineer prepare load plans including the information required in Section 8.20 of the Alliance Standard. Floor load plans should be visibly posted on all levels of the building.
xvi. "Provide signage or the appropriate markings at all areas used for storage to indicate the acceptable loading limits detailed in the Load Plan.

xvii. Repair the exterior façade system to prevent water intrusion.

Long Term (6 Months) :

i. Depending on the findings of the DEA, permanent remedial measures should be conducted for the safety of the building.
ii. 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. Or provide 2% slope on the exposed surface to prevent accumulation of water.
iii. "Provide Certificates of Occupancy for review.

The recommendations for Electrical Safety corrective actions are*:*

Immediate (3 to 6 Days)	Find out the cause of the overheating and take proper action, including replacing cable or equipment where necessary.
Short Term (3 Weeks)	Develop and implement an electrical safety program. Include key topes such as lock out tag out procedures, personal protective equipment requirements, etc. Reference NFPA 70e for example program requirements. Establish a periodic inspection program to ensure the electrical systems are free from damage, debris, dirt, lint, etc. Maintain records concerning inspections and follow up actions. Switchboards and/or distribution boards should have capacity information labels e.g current carrying capacity of bus bar, rating of main incoming breaker , size of panel and permitted no. of CB, maximum permitted load connection capacity, etc. Install phase separators between terminal connections at the noted locations.
Mid Term (6 Weeks)	Have a qualified electrical engineer develop an as-built single line diagram detailing key components and capacity of the electrical system. Need to remove looping of wiring/cables at circuit breakers. Provide protective cable guards for all cable runs from MDB to LT panels. Provide cable sockets for stranded conductors having a nominal cross-sectional area 6mm2 or greater.

Long Term (6 Months)	Develop an Insulation Resistance Measurement Program that ensures deterioration of insulation resistance will be identified quickly. Testing should be in compliance with InterNational Electrical Testing Association (NETA). All transformers, switchgears etc. shall be subject to an insulation resistance measurement test to ground after installation but before any wiring is connected. Insulation tests shall be made between open contacts of circuit breakers, switches etc. and between each phase and earth. Ensure appropriate size for generator room in order to properly access the generator to perform routine maintenance activities

The recommendations for Fire Safety corrective actions are:

Immediate (3 to 6 Days)	Remove all combustibles stored underneath the cutting tables at the noted locations.
Short Term (3 Weeks)	Non-compliance-1: Install 2 hour fire separation walls with 1.5 hr fire rated doors at child care on 3rd floor and direct access to an exit enclosure must be provided. Non-compliance-2: Install 2 hour fire separation walls with 1.5 hr fire rated doors at generator room on ground floor.
Mid Term (6 Weeks)	Develop an emergency evacuation plan which includes all components required by the Alliance Standards and communicate the plan to all employees in accordance with Alliance Standard, Part-13, Section-13.3. Provided monitoring in accordance with Section 5.7.5 of the Alliance Standards when the new fire alarm system is installed. Post emergency egress maps/fire evacuation maps at the entrance to each exit stair or main point of egress as per Alliance Standards Part 13 Section 13.3 Evacuation Plan Develop a testing and maintenance program that ensures the emergency power for exit signs is tested at least once per year. If battery operated signs are used, these lights are tested on a monthly basis. Functional testing of battery powered signs is provided for a minimum 90 min once per year or, since battery back up is used , these lights are required to be tested on a monthly basis. Develop a testing and maintenance program that ensures the operation of all lights is verified at least once per year. If battery-operated lights are used, these lights shall be tested on a monthly basis. Functional testing of battery powered lights shall be provided for a minimum 90 min once per year. Install signage adjacent to each stair door indicating the stair name and the floor level at the noted locations in accordance with Alliance Standard, Part-6, Section-6.9.3.1. Complete fire department pre-planning activities with the local Fire Service and Civil Defense in accordance with

	Alliance Standard, Part-13, Section- 13.1.1(2). Once the standpipe system is installed provide required identification signs at the noted locations. Signage must comply with NFPA 14. Apply to Electricity license issuing Board for electrician License. Apply to RAJUK for issuance of occupancy certificate and pursue the matter to expedite.
Long Term (6 Months)	Replace all collapsible, sliding, roll-down gates and shutters in means of egresses with side-hinged swinging type doors of proper width and rating in accordance with Alliance Standard,Part-6,Section-6.8.1. Remove all hasps, locks, slide bolts, or other locking devices at the noted locations. According to section 6.8.2.2 doors may be locked where the latch and lock are disengaged with one motion where the occupant load does not exceed 49 persons. Turning a door handle and disengaging a lock is considered two motions. Install a standpipe system at required locations designed by a qualified fire protection engineer. The system should be compliant with the requirements of NFPA 14. The hydraulic calculations should be reviewed by Alliance and review to be completed prior to start of work. All doors on these stairs needs to be 1.5 hour rated. Provide fire-resistive rated barrier at exit enclosures in accordance with Alliance Standards Part 4 Section 4.5 : Separation. Consult a qualified fire protection engineer to design the required rated construction barriers. Install a new fire pump if needed based on hydraulic calculations for the standpipe and sprinkler system. All new installations and design requirements outlined in BNBC Part 4 Chapter 4 for water supplies shall be replaced by the requirements of NFPA 20 (fire pumps), NFPA 22 (water tanks), and NFPA 24 (underground water mains).The Owner shall contact the Alliance prior to conducting the final acceptance testing of the fire pump installation to allow the Alliance to witness this test. A final inspection of the installation shall be conducted by the Alliance prior to final acceptance of the installation by the Alliance. Install a automatic fire alarm system per NFPA 72 including pull stations at egress points, smoke detectors in air handling equipment,visual and audible devices must be spaced appropriately based on occupancy type in accordance with NFPA 72. Provide fire resistive rated doors and windows where required in any fire rated walls across the entire premise per Section 4.6 of Alliance Standards. Aisles must be always free and as per Alliance Standard Part-6, Section-6.5.1 aisles shall be provided with a minimum unobstructed clear-width of 0.9 m(36 inch).

	Provide posted occupant loads as per Alliance Standards Part 6, Section 6.4.4: Posting of Occupant Load. Every door in a stair enclosure serving more than 5 stories shall be provided with re-entry unless it meets the following requirements. Stair doors may be permitted to be locked from the stair (ingress) side that prevents re-entry to the floor provided at least two floors allowing re-entry to access another exit are provided, there are not more than 4 stories intervening between re-entry floors, re-entry is allowed on the top or next to top level, reentry doors are identified as such on the stair side, and locked doors shall be identified as to the nearest re-entry floors. When the discharge floor is determined to be a required reentry floor using the above requirements, re-entry does not have to be provided back into the building on this level. Provide fire-resistive rated fire barriers between hazard types in accordance with Alliance Standards, Part-4, Section-4.5: Separation . Consult a qualified fire protection engineer to design the required rated construction barrier. In process goods must be kept in accordance with Alliance Standard,Part-3,Section-3.4.2.1.6. Fire department (Siamese) inlet connections shall be provided to allow fire department pumper equipment to supplement the fire protection systems. Fire department outlet connections shall be provided to allow fire department pumper vehicles to draw water from ground-level or underground water storage tanks. Connections shall match the Fire Service and Civil Defense hose thread standard. Install Illuminated exit signs at entrances to exits and along the path of egress anywhere the continuation of egress is not obvious or there is a change in the direction of the path of travel. Install handrails on both sides of the stair in accordance with Alliance Standard,Part-6,Section-6.9.2.4, 6.12.1.1 and 6.12.1.2. Make sure all required exit signs are illuminated continuously at all times.Exit signs may be illuminated either by lamps external to the sign or by lamps contained within the sign. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5. Approved self-luminous signs which provide evenly illuminated letters having a minimum luminance of 0.2cd/m2 may also be used. According to Alliance Standard,Part-13, Section-13.1 and 13.1.1, create a Fire Safety Director position and fill the position with an individual that has had sufficient training to be able to carry the required duties Establish and implement an inspection, maintenance, and testing program for the standpipe and hose system. Program must comply with the requirements of NFPA 25. According to Alliance Standard, Part-9, Section-9.1.7,

	develop a hot work permit program. The program must comply with the requirements of NFPA 51B. In general, this program should address process of request and approval authorities, necessary checks prior approval, standby fire watch and firefighting equipment, sounding of alarm procedure, duration and expiry of permit and re-approval procedure etc. Develop and implement corporate and plant policies on housekeeping to ensure scheduled cleaning for floor, wall, ceiling, supply and return air ventilation systems. Promptly reschedule skipped cleanings. Provide a documented line of authority for authorizing a cleaning delay and rescheduling. As a general rule the maximum tolerable deposit thickness for loose fluffy lint is 13 mm (½ in.) over a maximum of 46.5 m2 (500 ft2). Limit dense deposits to 6 mm (¼ in.) and oil saturated deposits to 3.2 mm (⅛ in.). Provide a fire-resistive rated assembly between the exterior exit stairs and the building up to 10 ft beyond the end of the stair to achieve the required separation. The rated assembly should be approved and/or designed by a qualified fire protection engineer. Provide fire rated opening protection at all windows and other openings on all the fire rated walls across the entire premises. If these openings are not required, close these. Provide 2 hour fire-resistive rated construction barriers at the exit enclosures. Fit doors that open in the direction of egress, side-swinging, self-closing, non-lockable, certified fire doors of 1.5 hr rating in all stairwell enclosures. Consult a qualified fire protection engineer to design the required rated construction barriers. Pull stations at egress points throughout entire building must be spaced appropriately based on the occupancy type in accordance with NFPA 72. Provide 1.5 hour fire protective opening assemblies in 2 hour rated exit enclosures at the main building. Replace all collapsible, sliding, roll-down gates and shutters in the means of egresses with side-hinged swinging type doors of the proper width and rating. Get at least 25 percent of the occupant i.e, 250 person out of 1000 occupant trained and certified in fire fighting, first aid, and rescue training by the proper authority. Provide 2 hour fire separation for the generator room, 1 hr fire separation for the store following Table 4.4.1 of the Alliance Standards or Table 4.1.1 from BNBC Part 4. Consult a qualified fire protection engineer to design the required rated construction barriers. Provide fire department connection as required by Alliance standard. Install illuminated exit signs at the entrances to the exits and along the path of egress anywhere the continuation of egress is not obvious or there is a change in the direction of

	the path of travel. Install emergency lighting for all paths of egress in accordance with Alliance Standard Section 6.7. Illumination shall be a minimum of 10 lux for all corridors, exit doors, and stairways. Aisles shall be provided with a minimum 2.5 lux. Provide handrails on both side of each stairway. Provide intermediate handrails when the stair width exceeds 2.2m (87 inch). Provide handrails of a height between the range 865 mm (34 in.) and 965 mm (38 in.). Once a standpipe system is installed at required locations designed by a qualified fire protection engineer, provide an inspection, testing and maintenance program in compliance with NFPA for the new system. Develop a hot work permit program. The program must comply with the requirements of NFPA 51B. In general, this program should address the process of requesting permits and the approval authorities, the necessary checks prior to the approval, standby fire watch and fire fighting equipment, sounding of alarm procedures, the duration and expiry of the permit, and the reapproval procedures, etc. Make sure all required exit signs are illuminated continuously at all times. Exit signs may be illuminated either by lamps external to the sign or by lamps contained within the sign. The source of illumination shall provide not less than 50 lux at the illuminated surface with a contrast of not less than 0.5. Approved self-luminous signs which provide evenly illuminated letters having a minimum luminance of 0.2cd/m2 may also be used.