Name of the Factory : **Thermex Yarn Dyeing Ltd**

Address of the Factory : Karardi,Shibpur, Narsingdi.

Present Status of the Factory : Under Operation

Structural assessment conducted by : Alliance

Date of Structural Inspection : 10-May-2014

Fire & Electrical assessment conducted by: Alliance

Date of Fire & Electrical Inspection : 6-May-2014

BASIC INFORMATION:

The present garment factory is a seven story factory building with beam-column frame system. The following general information was noted:

i.	Building Usage Type	: Factory Building.
ii.	Structural System	: 6,5,3and 2nos 2-storid RCC and 9-nos PEB structures.
iii.	Floor System	: Various
iv.	Floor Area	: 638034 sft.
v.	No. of Stories	: RCC: 6,5,3,2 storied.PEB:2-2 storied & others 1-storied.
vi.	Foundation Type	: Unknown
vii.	Construction Year	: 2005~2009
viii.	Design Drawings	: Some are Available
ix.	Soil Investigation Report	: Some are Available
x.	Construction Materials	: Reinforced Concrete & PEB
xi.	Generator	: Ground Floor

RECOMMENDATIONS FOR CORRECTIVE ACTION:

The recommendations of corrective action for both Structural, Fire and Electrical Safety comprises in Short Term, Mid Term and Long Term basis.

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.

Mid Term (6 Weeks):

i. Under guidance from a qualified structural engineer, address all areas of needed maintenance by correcting the identified issues.
ii. Have a qualified structural engineer document compliance with the seismic and wind requirements stated in the 2006 BNBC.
iii. Engage a qualified structural engineer to confirm satisfactory structural performance of the buildings under wind loading.

iv. Engage a qualified structural engineer to provide additional investigation into the areas of distress, separations, or cracking and provide a remediation plan if required.
v. 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
vi. Adequately anchor and brace all non-structural elements to resist earthquake forces to comply with the BNBC and Alliance Standard.

Long Term :

i. Provide Certificates of Occupancy for review.

The recommendations for Electrical Safety corrective actions are*:*

Immediate (3 to 6 Days)	Remove all improperly stored materials (combustible materials) were found in the generator room.
Short Term (3 Weeks)	Develop and implement an electrical safety program. Include key topics such as lock out tag out procedures, personal protective equipment requirements, etc. Reference NFPA 70e for example program requirements. All metal in the building is connected to the building earthing, grounding system such as metal rebar in concrete, metal frame of building and metal water pipe revise the connections in the panels to eliminate multi-looping of wiring. Light fixtures without protective covers are not allowed to installed in storage areas. Distribution boards must be provided 1m (39 inch.) with adequate clearance. All boxes and enclosures (including transfer switches, generators, and power panels) for emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system.The required marking can be by color code, the words "emergency system," or any other method that identifies the box or enclosure as a component of the emergency system.
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. Additional insulation is provided for wiring exposed to external heat sources. Wiring systems should be selected and erected considering the effect of damage caused by ingress of water. Underground service cables Should be laid in conformity with the requirements of concealed wiring Separate neutral cable Connect to each load.

Long Term (6 Months)	Have a qualified electrical engineer design a lightning protection system according to the BNBC requirements. Have a licensed electrician install the designed system. Complete Thermographic scans at least on a three year cycle. Thermographic scans should be completed in accordance with the Standard for Infrared Inspection of Electrical Systems & Rotating Equipment and NFPA70B or a comparable standard.

The recommendations for Fire Safety corrective actions are:

Immediate	NA
Short Term (3 Weeks)	Remove all hasps, locks and slide bolts from exit doors in complaince with the Alliance Standard. The aisles shall be kept free of materials. Materials shall be stacked at least 1.1 m away of the walls as per NFPA 13 Part 3 Section 3.10. Develop an emergency evacuation plan in accordance with the Alliance Standard and communicate the plan to all employees. Remove all combustibles stored underneath the cutting tables at the noted locations.
Mid Term (6 Weeks)	Have a qualified fire protection engineer review the pump capacity and ensure hydraulic calculation is performed to ensure that existing pump can support the installation. Also, identify all other performance data and ensure conformity to NFPA 14, 20, 22 and 25 standards. Also, install a water storage tank in accordance with NFPA 22.Post the occupant load for every assembly and production floor in the facility in a conspicuous space near the main exit or exit access doorway for the space. Provide a fire-resistive rated assembly between the exterior exit stairs and the building (and 10 ft beyond the ends of the stairs) to achieve the required separation. The rated assembly should be approved and/or designed by a qualified fire protection engineer. Install a standpipe system at required locations designed by a qualified fire protection engineer. The system is to be compliant with the requirements of NFPA 14. 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. 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 minutes per year.

	Post the occupant load for every assembly and production floor in a facility in a conspicuous space near the main exit or exit access doorway for the space. Complete fire department pre-planning activities with the local Fire Service and Civil Defense in accordance with Section- 13.1.1(2) Install signage adjacent to each stair door indicating the stair name and the floor level in both English and Bengali. Apply to LGED in an expeditious manner for issuance of the Certificates of Occupancy for each building and ancillary structure according to building use
Long Term (6 Months)	Replace non-compliant doors and frames in the means of egress with side-swinging doors. Replacement doors shall be a minimum width of 0.8 m (32 in), and are listed, approved, self-closing, fire rated door assemblies (door and frame) with latching panic hardware. Provide fire-resistive rated opening and penetration protection for rated walls and assemblies in accordance with Alliance Standard Sections 4.6 and 4.7. Consult a qualified fire protection engineer to design the required opening protectives and penetration systems. Provide fire-resistive rated construction barriers and associated opening protection for exit enclosures in accordance with Alliance Standard Sections 4.5 and 4.6. Consult a qualified fire protection engineer to design the required rated construction barrier. Provide fire-resistive rated construction barriers and associated opening protection for shafts in accordance with Alliance Standard Section 4.5.7. Consult a qualified fire protection engineer to design the required rated construction barrier. Replace non-compliant doors and frames in the means of egress with side-swinging doors. Replacement doors shall be a minimum width of 0.8 m (32 in), and are listed, approved, self-closing, fire rated door assemblies (door and frame) with latching panic hardware. Need to provide training and certification for the required number of people in fire fighting, first aid, and rescue training by an appropriate authority in accordance with the Alliance Safety Training Curriculum. Implement training program with proper documentation in accordance with the Alliance Safety Training Curriculum on fire safety Provide fire-resistive rated construction barriers between hazard types in accordance with Alliance Standard Sections 3.4 and 4.5. Consult a qualified fire protection engineer to design the required rated construction barrier. Provide Fire Department (Siamese) connections in

	accordance with Alliance Standard Section 5.5.4. Connections shall match the Fire Service and Civil Defence hose thread standard. Develop a testing and maintenance program that ensures the operation of all egress lighting 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 of 90 minutes once per year. Provide re-entry to floor levels from the stairwells in accordance with Alliance Standard Section 6.8.3. Install handrails on both sides of the stairs in accordance with Alliance Standard Sections 6.9.2.4, 6.12.1.1 and 6.12.1.2. Arrange for direct connection of the system to a central station monitoring service or the Fire Service and Civil Defence. Until that time that a central station monitoring service or direct connection to the Fire Service and Civil Defence can be set up, a person shall be assigned to contact the fire department in the event of fire alarm activation. An annunciator shall be located in a constantly attended location (such as a fire control room) to alert this person. Develop a hot-work permit program. The program must comply with the requirements of NFPA 51B. Provide continuously illuminated exit signs at all required exits and along egress paths, especially where path has a change of direction. Exit signs may be illuminated either by lamps exterior to the sign or 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 0.2 cd/m2 may also be used. Smoking is prohibited in garment factory buildings or similar uses. Post "No Smoking" signs in English and Bengali at all building entrances. If the Owner designates a smoking area outside the building, information on the location of these areas shall be posted on the "No Smoking" signs. Once a compliant standpipe system is installed at required locations designed by a qualified fire protection engineer, provide signage in compliance with NFPA for the new system. Once a compliant standpipe system is installed at required locations designed by a qualified fire protection engineer, establish an inspection, testing and maintenance program in compliance with NFPA for the new system. Establish an inspection, testing, and maintenance program for the fire pump. Program must comply with NFPA 25.