

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Creative Designers Ltd.
Address of the Factory	: Plot no# 283, Ibrahimpur, Dhaka Cantt, Dhaka-1206 Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 13 th June, 2015.
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 13 th June, 2015.
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 13 th June, 2015.
BGMEA Membership No.	: 4154

BASIC INFORMATION:

The present garment factory is a ten storied with in addition one basement floor industrial building with beam-column frame structure. The following general information was noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC beam column frame system.
iii. Floor System	: RCC beam slab floor system.
iv. Floor Area	: Total Building area 34000 Sft 20400 Sft (Creative Designers Ltd.)
v. No. of Stories	: 10 storied +one Basement floor.
vi. Construction Year	: Building was built in one phase (1999-2001).
vii. Foundation Type	: Pile foundation.
viii. Design Drawings	: Available- Structural design drawing, soil test report, approval drawing. Not Available- Machine lay-out plan, architectural design drawing, material test report, floor load plan.
ix. Soil Investigation Report	: Available.
x. Construction Materials	: Brick aggregate. (Identified by removing plaster)
xi. Generator	: Basement floor.

RECOMMENDATIONS FOR CORRECTIVE ACTION:

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

The recommendations for **Structural Safety** corrective action are:

Short Term (Immediate)	: None.
Mid Term (6-weeks)	: <ul style="list-style-type: none">• Produce and actively manage a loading plan for all floor plates within the factory giving consideration to floor capacity and column capacity.
Long Term (6-months)	: <ul style="list-style-type: none">• Structural engineer to prepare full set of structural drawing, as built drawing and prepare/update calculations showing the structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure.

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The recommendations for **Fire & Electrical Safety** corrective action are:

(A): Recommendations for Fire Safety corrective actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<ul style="list-style-type: none"> • None.
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (1 ~ 2 weeks) and should be a regular activity</i></p>	<ul style="list-style-type: none"> • Factory need to have proper testing plan & record of fire safety equipment. • Ensure minimum width of aisles as follows: <ul style="list-style-type: none"> (a) Seats on both sides of the aisle 1 m (b) Seats on one side of the aisle 0.9 m • Lights in storage area need to be installed with protective covers and conduits. • Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9m and when used as a storage facility there shall be a minimum clearance of one third the floor height from the ceiling to the top of the storage stack. • Factory needs to be installed with adequate illuminated emergency lighting in floors, exits & stairs.(Escape route).
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • Factory needs to have as built drawing with proper dimensions showing all the means of escape. • Fire license need to be updated for full occupied area. • All the exit doors need to be install side swinging so that unlockable doors can be opened easily in the direction of evacuation without the use of a key • Minimum width of door shall be at least 0.9 m & height shall be 2 m. • Provide handrail on both sides of each stairways. • Emergency back-up power needs to be connected for critical fire safety system and not less than 30 minutes in case of failure of power supply. • Factory needs to establish command station on the entrance lobby and equipped with detailed floor plans along with clearly demarcated locations of fire

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	<p>detection and fighting devices and through the panel board able to detect fire alarm from any floor. It needs to be manned with properly trained personnel having responsibility of maintenance and operating firefighting facilities within the building.</p>
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> • Factory needs to have a proper pre-plan for fire department. • Factory needs to have sufficient width of stair (8mm per occupant and 0.90 m minimum) at all floor of the building and need to be comply (Table 2.19) of NTPA Guideline. • Factory needs to ensure minimum two number of stair in every floor of the building that complies with table 2.19. • Both of the final escape route (Final exit-1 & 2) needs to provide protected by lobby (4 hour fire rated enclose construction and 2 hour fire rated opening or door) at each floor level entrance, also need to have this protected route till to reach safe refuse area or outside of the building • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors with other occupancy. • Factory need to protect the boiler room from the finishing section on 5th floor of the building by 4 hours rated construction with 2 hours fire rated door/opening <p>Factory need to protect the generator room from the stair-2 at north-west portion which is located at basement floor of the building by 4 hours rated construction with 2 hours fire rated door/opening.</p> <ul style="list-style-type: none"> • The entire exits connecting to the staircases(2 numbers staircase) need to be protected with fire and smoke resistant enclosures and opening (2 hour rated enclosure and 1.5 hour rated door)and provide a protected route from all though the stairway to the final exits. • Walls enclosing the lift core shall have a fire resistance rating of 2 hours and lift car doors shall have a fire resistance rating of at least 1 hour. • Factory need to have 4 hours rating for walls (enclosure) and 2 hours for door openings fire separated

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	<p>& smoke proof lobby in the both of the staircase.</p> <ul style="list-style-type: none">• All the stairs need to be protected with a 4 hours fire resistant and smoke proof lobby (4 hours rated enclosure and 2 hour rated door)and provide a protected route from all though the stairway to the final exits.• Factory need to install centralized and automatic fire detection & alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.• The factory need to install manually operated electrical fire alarm system and automatic fire alarm system with single or multiple call boxes on all occupied floors, including other tenanted floors of the building.• Factory needs to install control panel for centralized and automatic fire detection and alarm system at required location.• Install suitable public address system having communication to all floors as well as facilities to receive messages from all floors.• Install proper standpipe system having at least 100 mm dia of standpipe. First aid hose system (38 mm nominal) shall be provided (Ref. Fire Service Standard # 9) in addition to Fire Aid• Fire Fighting Appliances in existing high rise NTPA (20 m) buildings. In addition 50 mm or larger hose connection facility shall be provided• Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 kPa and standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 kPa.• Factory needs to be installed with Siamese connection for to the standpipe system located outside the building and accessible to the fire department connection• Factory needs to have dedicated fire pump with backup power system & sufficient capacity for achieve required pressure in the remote place of the factory.• Factory needs to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900liter x 75min=142500 liters water
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	storage tank.
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(B): Recommendations for Electrical Safety corrective actions:

<p>Immediate</p> <p><i>(the factory should not continue to be occupied until these non-conformities have been rectified):</i></p>	<ul style="list-style-type: none"> • Remove all unused cables from distribution boards and make sure all necessary cables are properly terminated at its point of termination using appropriate size and type of lug. • Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point,) of overheating (> ambient+400C) and take proper action.
<p>Short Term</p> <p><i>(Actions that must be incorporated into a Fire Safety Management Plan immediately (a week) and should be a regular activity</i></p>	<ul style="list-style-type: none"> • Ensure all distribution boards (including panel door) are earthed properly. • Ensure overcurrent protection device (circuit breaker/fuse) for each circuit/branch circuit. • Ensure proper earthing connections at all electrical equipment. • Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering. • Provide provision for inspection of all earthing system and ensure inspection is being completed and documented.
<p>Mid Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • Install appropriate number of safety signage at substation and generator room. Also ensure graded rubber mats are provided in front of all distribution boards. • Provide Instruction board for first aid and artificial respiration in the substation room and generator room. • Ensure in the substations room and generator room adequate illumination level as per standard. • Fill the transformer breather with fresh silica gel and oil cup with fresh oil. • Provide two separate and distinct connections of earthing for each generator. • Provide dedicated & adequate size of earthing with proper identification for each circuit from the earth busbar of distribution boards and ensure continuous

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	<p>earth path is back to main building intake.</p> <ul style="list-style-type: none"> • Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's and busbar. • Replace wooden base with metal clad construction for mounting the lighting boards and switch controls. • Ensure all electrical cables are sized according to capacity of circuit breakers. • Provide adequate support or mechanical guards for electrical equipment where necessary. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Provide emergency power connection for life safety loads (fire alarm, fire pump, emergency lighting, exit signage, etc.) temporarily within 6 weeks and find out a permanent solution within 6 months. • Connect all metal in the building to the building earthing system. • Find out the cause (improper cable/over current selection, over loading, improper lug, improper cable joints, rusted connection, insulation damage, multiple cables at single point,) of overheating { ambient+(200C-400C) } and take proper action.
<p>Long Term</p> <p><i>(The remedial works indicated must be carried out within a period of 6 months)</i></p>	<ul style="list-style-type: none"> • Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system. • Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data. • Inspect electrical switchgear and panel boards on an annual basis. • The substation should be installed on the ground. Consult with a qualified structural engineer if it is not possible to install the substation on ground floor. Also ensure substation room has minimum height & area as per NTPA Table-4.3 respectively. • Ensure the substation room has adequate fire separation from the production area/main building.

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	<ul style="list-style-type: none">• Provide adequate means of ventilation for the substation room based on the installed equipment and ensure that ventilation does not impact on fire barriers.• Ensure underground cables for electrical distribution in the compound of the building are encased in GI or PVC pipes and laid in earth trenches of sufficient depth as per mentioned standard.• Ensure all high tension cables are laid following standard cable laying techniques.• Ensure the generator room has adequate fire separation from the production area.• Provide adequate means of ventilation for the generator room based on the installed equipment considering fire barriers.• Ensure appropriate generator room size in order to properly access the generator to perform routine maintenance activities.• Ensure distribution boards have no opening and all live internal components are concealed properly.• Provide dedicated & adequate size of neutral with proper identification for each applicable circuit.• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.• Use noncombustible material to make channel provide adequate covers on cable channel.• Provide proper cable terminator/connector for stranded conductors at its point of termination.• Install separate distribution boards for lighting and power circuits.• Install lightning protection system on the building.
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