

## Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Apt International Ltd.
Address of the Factory	: Shahmirpur, Fakirnirhat, Karnafully, Chittagong, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: VEC
Date of Structural Inspection	: 6 <sup>th</sup> July, 2015
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 6 <sup>th</sup> July, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 6 <sup>th</sup> July, 2015
BGMEA Membership No.	: 4390

### **BASIC INFORMATION:**

The assessed factory building is 3 storied RCC beam column frame structure except approximately 10% area of 2<sup>nd</sup> floor is corrugated iron shed supported on RCC column and 70% area is under construction of 2<sup>nd</sup> floor slab. The entire building is being occupied by Apt International Ltd. The following general information were noted:

i. Building Usage Type	: Garment Factory.
ii. Structural System	: RCC beam column frame structure.
iii. Floor System	: RCC beam slab floor system.
iv. Floor Area	: Total floor area is 55,500 sft.
v. No. of Stories	: 3 Storey.
vi. Construction Year	: Building was built in One phase 2012.(Construction work on going)
vii. Foundation Type	: Isolated column footing foundation.
viii. Design Drawings	: Available- structural design drawing (without detail drawing of retrofitted columns and retrofitted columns foundation drawing), approval plan, architectural design drawing and soil test report. Not available: machine layout plan, material test report and floor load plan.
ix. Soil Investigation Report	: Available.
x. Construction Materials	: Brick aggregate in column.
xi. Generator	: At separated structure.

### **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"><li>• Building engineer to check and provide calculations showing the structural adequacy of supporting slab.</li></ul>
Long Term (6-months)	: <ul style="list-style-type: none"><li>• Building Engineer need to prepare as built structural drawing and floor load plan. Prepare/update calculations showing the</li></ul>

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structural adequacy of the floor system taking into account the factory design imposed loading and the as built structure.

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"> <li>• None.</li> </ul>
<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"> <li>• All the firefighting equipment's need to test with proper documents.</li> <li>• Factory needs to have marked aisles in all working floor according to 0.9m for one side seat and 1.0m for both side seat.</li> <li>• Propagation of fire, smoke, gas or fume through the opening of fire resistive floors and walls need to be restricted by sealing such opening with an approved material which needs to have a minimum 2 hours fire resistance rating of the walls.</li> <li>• Combustibles are to be managed with good housekeeping. Storage facilities with no air-conditioning duct shall be minimum 2.9 m 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.</li> </ul>
<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"> <li>• Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension.</li> <li>• Fire license needs to be updated for full occupied area.</li> <li>• Fire manager/Director need to have safety training from proper authority &amp; worker of the factory should as far as possible be trained for use fire extinguisher.</li> <li>• All the exit doors need to be replaced by side swinging so that un-lockable doors can be opened easily in the direction of evacuation without the use of a key.</li> <li>• Factory needs to provide handrail on both sides of all the stairways.</li> <li>• Factory needs to be installed with adequate illuminated emergency lighting in floors, exits&amp; stairs. (Escape route)</li> </ul>

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<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"><li>• Factory needs to have a proper pre-plan for fire department.</li><li>• Final exit route-5 (Stair-3 route) need to be protected (1 hour</li><li>• on with rated constructi0.75 rated door hour( at each floor level entrance and need to be protected from generator at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area.</li><li>• Final exit route-3 need to be protected (1 hour rated construction with 0.75 hour rated door) at each floor level entrance and need to be protected from bonded ware house at ground floor by 2 hours rated construction with 1.5 hours rated door/opening, also need to have a protected escape route till to reach safe refuse area.</li><li>• Storage area need to be protected with 2 hours rated construction and 1.5 hours rated opening or doors.</li><li>• Generator:</li><li>• Generator room need to be protected with 4 hours rated construction &amp; 2 hours rated opening / door from the final exit route-5 located at ground floor.</li><li>• All the stairs need to be protected with fire and smoke resistant enclosures and opening (1 hour rated enclosure and 0.75 hours rated door)and provide a protected route from all though the stairway to the final exits.</li><li>• Factory need to install centralized and automatic fire detection &amp; alarm system on all occupied floors, including other tenanted floors of the building as per NTPA Guideline.</li><li>• 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.</li><li>• Factory needs to install control panel for centralized automatic smoke detection &amp; fire alarm system according to NTPA Guideline.</li><li>• Factory need to be installed by 1 riser per 1000 sqm of floor area with at least 38 mm dia of hoses.</li><li>• Factory need to ensure the minimum pressure for standpipes supplying a 50mm or larger hose shall be at least 300 Kpa. For standpipe supplying first aid hose (38mm nominal) may have a minimum pressure of 200 Kpa.</li><li>• Factory needs to be installed with Siamese connection for to the standpipe system located outside the building</li></ul>
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	<p>and accessible to the fire department connection.</p> <ul style="list-style-type: none"> <li>• Factory needs to have dedicated fire pump with backup power system &amp; sufficient capacity to achieve required pressure in the remote place of the factory.</li> <li>• Factory need to have sufficient water storage capacity to get adequate pressure to feed fire-fighting equipment and at least 1900ltr x 75min=142500 liters water storage tank.</li> </ul>
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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"> <li>• None.</li> </ul>
<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"> <li>• Provide two separate and distinct connections of earthing for each generator.</li> <li>• Ensure Panel boards (including panel door) are not properly grounded.</li> <li>• Ensure all electrical cable properly terminated at its point of termination.</li> <li>• Ensure proper earthing connections at all electrical equipment.</li> <li>• Clean interior components from dust and debris and seal all openings within the enclosure to prevent dust and debris from entering.</li> <li>• Ensure inspection is being completed and documented for all earthing system.</li> </ul>
<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"> <li>• Post safety signage in generator room and install appropriate number and type of fire-fighting equipment in generator &amp; Substation room and ensure graded rubber mats are provided in front of all distribution boards.</li> <li>• Provide Instruction board for first aid and artificial respiration in the substation room and generator room.</li> <li>• Provide dedicated &amp; adequate size of earthing with proper identification for each circuit.</li> <li>• Rewire to ensure each incoming supply to an MCB/MCCB has a dedicated supply from bus-bar. Avoid the use of multiple cables on outgoing side of</li> </ul>

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	<p>MCB's / MCCB's.</p> <ul style="list-style-type: none"> <li>• Ensure all electrical cables are sized according to capacity of circuit breakers.</li> <li>• Provide adequate support or mechanical guards for electrical equipment where necessary.</li> <li>• Ensure cable joints are made in respect of conductivity, insulation and mechanical strength.</li> <li>• Connect all metal in the building to the building earthing system.</li> </ul>
<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"> <li>• Develop an electrical layout diagram and an as-built single line diagram detailing key components and capacity of the electrical system.</li> <li>• Establish a periodical Insulation and earth Resistance Measurement Program and record the related testing data.</li> <li>• Inspect electrical panel boards on an annual basis.</li> <li>• Ensure panel boards have no opening and all live internal components are concealed properly.</li> <li>• Provide dedicated &amp; adequate size of neutral with proper identification for each circuit.</li> <li>• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.</li> <li>• Provide adequate covers on cable trench and cable channel.</li> <li>• Provide proper cable terminator/connector for stranded conductors at its point of termination.</li> <li>• Install separate distribution boards for lighting and power circuits.</li> <li>• Install lightning protection system on the building.</li> </ul>