

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: Wonder Apparels Ltd.
Address of the Factory	: Alam Super Market (2nd&3rd floor) 413 New Jurain, Postogola, Dhaka-1204.
Present Status of the Factory	: Under Operation
Structural Assessment Conducted by	: BUET
Date of Structural Inspection	: 2014-04-15
Fire Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Fire Inspection	: 2015-04-02
Electrical Assessment Conducted by	: VERITAS Engineering & Consultant
Date of Electrical Inspection	: 2015-04-02
BGMEA Membership No.	: 1511

BASIC INFORMATION:

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| i. Building Usage Type | : Garments Factory + Shopping Centre |
| ii. Structural System | : R.C. beam column frame structure having irregular grid. |
| iii. Floor System | : Edge supported R.C. solid floor slab system with R.C. beam at The edges. |
| iv. Floor Area | : Approx. 3338 sq.m per floor with a total of 13352 sq.m (as per Architectural drawing) |
| v. No. of Stories | : 4 stories. |
| vi. Construction Year | : 1990-1993. |
| vii. Foundation Type | : RCC Footings on 5" dia timber piles (as reported) |
| viii. Design Drawings | : RAJUK Sheet 1997 was available, As built drawing prepared in May 2013 was supplied |
| ix. Soil Investigation Report | : Post construction report is available, Prepared by PvIrittika Projektibidh, Rasul View, Flat 30, Bangla Motor, in May, 2013 |
| x. construction Materials | : Reinforced Concrete (Brick chips + 40 Grade plain MS bar, as Reported). |
| xi. Generator | : Outside of the building. |

RECOMMENDATIONS FOR CORRECTIVE ACTION:

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| Short Term (Immediate) | : 1. A minimum of 8 number flinch diameter cores are to be taken as soon as possible from different column and beam locations and tested with results used in the DEA report.
2. Other than ground floor all areas of storage loading is to be limited to 20 psf (1 kN/m ²) immediately. |
| Mid Term (6-weeks) | : 1. A DEA is required to be commenced immediately and completed within 6 weeks from issue of this report.
2. No further construction is to be carried out on this building until approval of the DEA is provided. |
| Long Term (6-months) | : N/A |

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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>	<p>N/A</p>
<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"> • 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 • 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. • Ensure the visibility of exit sign at every exit & in floors from all positions.
<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"> • Needs to have As Built Drawing <input type="checkbox"/> with proper dimensions showing means of escape. • 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. • Factory needs to maintain minimum width of exit 0.9 m and height 2m. • Provide handrail on both sides of stairways. • Ensure adequate illuminated emergency lighting in floors, exits & stairs. • Ensure emergency backup power for critical fire safety system.
<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. • Child care needs to be separated from substation room in 2nd floor. Exit excess will be directly to final exit. Separation wall needs to be 3 hours fire rated and also fire doors will be 3 hours fire rated.

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	<ul style="list-style-type: none"> • Factory needs to maintain minimum width of exit 0.9 m and height 2m. • Storage area needs to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Boiler: Factory need to protect the boiler room from the finishing section of 3rd floor of the building by 4 hours rated construction with 2 hours fire rated door/opening • Generator: Factory need to protect the generator room from the shop place located at ground floor of the building by 4 hours rated construction with 2 hours fire rated door/opening. • The entire exits connecting to the staircases(3 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 through 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.
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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"> • 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.
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<p>Short Term (<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 panel door of distribution boards are earthed properly. • 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. • Provide additional insulation for wiring exposed to external heat sources to protect cable. • Ensure overcurrent protection device (circuit breaker) for each 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. • Ensure inspection of all earthing system is being completed and documented.
<p>Mid Term <i>(The remedial works indicated must be carried out within a period of 6 weeks)</i></p>	<ul style="list-style-type: none"> • 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, all working place, exit light and escape light have adequate illumination level as per standard. • Fill the transformer breather with fresh Silica gel and oil cup with fresh Oil. • Ensure distribution boards have a minimum clearance of 1 m (39 in) in front. • Install circuit breaker and switched socket outlet in proper way and proper place to ensure secure installation. • Provide dedicated & adequate size of earthing with proper identification for each circuit and ensure continuous earth path is back to main building intake. • Rewire to avoid the use of multiple cables from incoming and outgoing side of MCB's/MCCB's. • Replace wooden boxes with metal clad construction for mounting the lighting boards and switch controls.

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	<ul style="list-style-type: none"> • Ensure all electrical cables are sized according to capacity of circuit breakers. • Make cable channel dust free and provide adequate covers on it. • Ensure cable joints are made in respect of conductivity, insulation and mechanical strength. • Seal the openings remaining after wiring system passes through the elements of building construction according to the degree of fire resistance. • 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 cable sat 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, and suitable arrangements should exist to prevent the entrance of storm or flood water into the substation area. 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. • 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 two separate and distinct connections of earthing for each generator.

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	<ul style="list-style-type: none">• Ensure appropriate generator room size in order to properly access the generators 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 circuit.• Ensure each distribution board is provided with a circuit list and means of identification is provided as per list.• Ensure surface/exposed wiring are run either horizontally or vertically with proper mechanical support and avoid wiring at an angle or hanging way with improper support.• 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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