

Summary of Preliminary Assessment on Structural, Fire and Electrical Safety

Name of the Factory	: DEVOR INDUSTRIES (PVT.) LTD.
Address of the Factory	: Salauddin Plaza, Sharifpur, National University, Gazipur, Bangladesh.
Present Status of the Factory	: Under Operation.
Structural Assessment Conducted by	: BUET
Date of Structural Inspection	: 28 th October, 2013
Fire Assessment Conducted by	: VEC
Date of Fire Inspection	: 27 th May, 2015
Electrical Assessment Conducted by	: VEC
Date of Electrical Inspection	: 27 th May, 2015
BGMEA Membership No.	: 5962
BKMEA Membership No.	: 1922

BASIC INFORMATION:

The assessed factory building is a five storey RCC building having beam column frame and beam slab floor system. 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 floor area is 66415 sft.
- v. No. of Stories : 5-Storey.
- vi. Construction Year : 2007-2010.
- vii. Foundation Type : Isolated column footing foundation.
- viii. Design Drawings : Available.
- ix. Soil Investigation Report : Available.
- x. Construction Materials : Brick Aggregate.(In column)
- xi. Generator : Ground 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) : None.

Long Term (6-months) :

- The consultant recommended storing of any kind of cartons, boxes, finishing materials and fabrics in such a manner so that intensity of loading does not exceed 60psf (3KN/m²).
- No horizontal or vertical extension shall be made without detail investigation.

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

(A): Recommendations for Fire Safety corrective actions:

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<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"> •
<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"> • Fire drill shall be conducted quarterly (4 times a year) under the Fire Safety Plan. A record of such drills shall be kept in writing for at least 3 years for the inspection of fire brigade whenever called for. • All the firefighting equipment's need to test with proper documents. • 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. • Lights in storage area needed 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. • Ensure illuminated exit signs in floors so that it is visible 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"> • Factory needs to prepare as built drawing with floor machine layout showing means of escape with proper dimension. • Fire manager/Director need to have safety training from proper authority & worker of the factory should as far as possible be trained for use fire extinguisher • 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. • Provide handrail on both sides of stairways. • Needs to provide Intermediate handrail as per NTPA Guideline. • Needs to provide Intermediate handrail as per NTPA Guideline. • Factory need to have emergency backup power for

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	critical fire safety system with sufficient capacity & arrangement according to NTPA Guideline.
<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 service & civil department. • Final exit route-2 (Stair-2 route) need to be protected (2 hours rated construction with 1.5 hours rated door) at each floor level entrance and need to be protected from boiler room at ground floor by 4 hours rated construction with 2 hours rated door/opening, also need to have the protected escape route till to reach safe refuse area. • Childcare needs to be separated from other occupancies (finishing quality section) with 3 hours rated construction and 3 hours rated opening or door. • Storage area need to be protected with 2 hours rated construction & 1.5 hours rated opening or doors. • Boiler room needs to be separated with 4 hours fire rated enclosure and 2 hours rated door/opening. • All the stairs need to be protected with fire and smoke resistant enclosures & opening (2 hours rated enclosure and 1.5 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 automatic smoke detection & fire alarm system according to NTPA Guideline. • Factory need to install proper standpipe system with having at least 100 mm dia of riser. • Factory needs 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

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	<p>kPa.</p> <ul style="list-style-type: none"> • 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 install 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 $1900 \times 75 = 142500$ liters water 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"> • None.
<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. • Install switchboards and panel boards in proper way or proper place to ensure safe installation. • Ensure cables are properly terminated at its point of termination using appropriate size and type of lug. • 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. • Ensure inspection of all earthing system 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"> • Provide two separate and distinct connections of earthing for each generator. • Install appropriate number and type of fire-fighting equipment at generator room. Also ensure graded rubber mats are provided in front of all distribution

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	<p>boards.</p> <ul style="list-style-type: none"> • Provide Instruction board for first aid and artificial respiration in the generator room. • Ensure in the generator room, all working place, exit light and escape light have adequate illumination level as per standard. • Ensure distribution boards have a minimum clearance of 1 m (39 in) in front. • Provide dedicated & adequate size of earthing with proper identification for each circuit. • Rewire to ensure single cable at busbar and/or circuit breaker terminal to avoid loose connection, overloading and separate controlling of each circuit/branch circuit. • Ensure all electrical wiring/cables are sized according to capacity of circuit breakers. • Avoid flexible cables for fixed wiring unless contained in an enclosure affording mechanical protection. • 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. • Ensure Lighting fixtures are supported from the structure properly. • 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

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	<p>data.</p> <ul style="list-style-type: none">• Inspect electrical panel boards on an annual basis.• Provide adequate means of ventilation for the generator room.• 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 circuit.• Ensure each distribution board is provided with a circuit list and means of identification is obtained as per list.• Provide adequate support or mechanical guards for electrical equipment and wiring where necessary.• Provide adequate covers on cable channel. Provide proper cable terminator/conductor for stranded conductors.• Install separate distribution boards for lighting and power circuits.• Install lightning protection system on the building.
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