

# BUILDING INTEGRITY | SUMMARY REPORT

SUPPLIER NAME	Surma Garments Washing & Finishing Co. Ltd.,
SUPPLIER ADDRESS	Plot # 22, Sector 2, Chittagong Export processing Zone, Chittagong, Bangladesh
AUDIT DATE	May 2014
AUDIT PERFORMED BY	Department of Civil Engineering, Bureau of Research, Testing and Consultation, Bangladesh University of Engineering and Technology (BUET)
AUDIT TEAM	2 auditors 1 engineer

GRAVITY LOADING EVALUATION	
GREEN	The building is fully safe.

SEISMIC PERFORMANCE RATING	
POOR	Possible significant structural and nonstructural damage and/or result in falling hazards in a major seismic disturbance, representing appreciable life hazards.

## BRIEF DESCRIPTION OF METHODOLOGY

Visual inspection and ASCE 31-03 Tier-1 Analysis

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## VISUAL INSPECTION AND CONCLUDING REMARKS

- The building may be rated as "GREEN" based on simple check of factor of safety of different types of column for gravity load only.
- The type of building, in this case, is concrete frame with infill masonry. These are, generally, non-compliant in respect of out-of-plane performance of the infill masonry. The infill masonry is a seismic hazard around the building's perimeter. The recommendation is to mitigate this hazard in those limited locations that will protect egress from the building, including stairwells and building entrances and exits using FRP or by other means to avoid out of plane failures during earthquakes. This shall be achieved within the next three months.
- Due to high slenderness ratio of columns in the ground floor, a detail engineering analysis of the structure need to be carried out to assess the performance under the seismic load.
- **The use of the building in its present condition may continue with due regards to the observations made above.**

## SEISMIC PERFORMANCE EVALUATION

### I. BASIC STRUCTURAL CHECKLIST NON-COMPLIANCES

Criteria	Description of Conditions	Comments

### II. GEOLOGICAL SITE HAZARDS AND FOUNDATIONS CHECKLIST NON-COMPLIANCES

Criteria	Description of Conditions	Comments

### III. BASIC NON-STRUCTURAL COMPONENT CHECKLIST NON-COMPLIANCES

Criteria	Description of Conditions	Comments
Parapets, Cornices, Ornamentation, and Appendages		
Unreinforced Masonry	Unreinforced masonry or hollow clay tile partitions shall be braced at spacing equal to or less than 10 feet in levels of low or moderate seismicity and 6 feet in levels of high seismicity	The height of unreinforced masonry walls in ground floor is greater than 10 feet

## DETAILED DESCRIPTION OF METHODOLOGY

### 1. The following criteria are used for the building integrity inspection:

- A. Permit review and verification.
- B. Visual assessment.
- C. Detailed assessment following ASCE-31 standards.
  - i. Level of Investigation
  - ii. Level of Performance  
Evaluation to Life Safety Performance Level (L.S.)
  - iii. Level of Seismicity  
According to BNBC (1993) and based on geotechnical investigation report
    - 1. Zone coefficient
    - 2. Site Class (as per BNBC 1993)  
Design short period response acceleration  $S_{DS}$   
Design spectral response acceleration at 1 sec.  $SD_1$
  - iv. Building Type
  - v. Screening Phase (Tier 1)
  - vi. Basic Structural Checklist
  - vii. Geological Site Hazards and Foundation Checklist
  - viii. Basic Non-structural Component Checklist

### 2. Gravity Loading Evaluation Definitions

GREEN	Factor of Safety (FS) of Column Strength is greater than 1.86 - the building is fully safe
YELLOW	Factor of Safety (FS) of Column Strength is between 1.5 and 1.86 - the building is marginally safe
AMBER	Factor of Safety (FS) of Column Strength is between 1.25 and 1.5 - the building's safety is not fully ensured
RED	Factor of Safety (FS) of Column Strength is less than 1.25 - the building is unsafe

### 3. Seismic Performance Ratings

(<http://www.berkeley.edu/administration/facilities/safer/findings.html#rating> )

GOOD	Buildings and other structures whose performance during a major seismic disturbance is anticipated to result in structural and nonstructural damage and/or falling hazards that would not significantly jeopardize life. Buildings and other structures with a GOOD rating would represent an acceptable level of
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earthquake safety, such that funds need not be spent to improve their seismic resistance to gain greater life safety.

FAIR	Buildings and other structures whose performance during a major seismic disturbance is anticipated to result in structural and nonstructural damage and/or falling hazards that would represent low life hazards. Buildings and other structures with a FAIR seismic rating would be given a low priority for expenditures to improve their seismic resistance and/or to reduce falling hazards so that the building could be reclassified GOOD.
POOR	Buildings and other structures expected to sustain significant structural and nonstructural damage and/or result in falling hazards in a major seismic disturbance, representing appreciable life hazards. Such buildings or structures either would be given a high priority for expenditures to improve their seismic resistance and/or to reduce falling hazards so that the building could be reclassified GOOD, or would be considered for other abatement programs, such as reduction of occupancy.
VERY POOR	Buildings and other structures whose performance during a major seismic disturbance is anticipated to result in extensive structural and nonstructural damage, potential structural collapse, and/or falling hazards that would represent high life hazards. Such buildings or structures either would be given the highest priority for expenditures to improve their seismic resistance and/or to reduce falling hazards so that the building could be reclassified GOOD, or would be considered for other abatement programs, such as reduction of occupancy.