TOR for Structural Assessment/ Electrical Safety/Fire safety Assessment for RMG Industries (Package-SD-1, Lot 2)

Background:

Ready-Made Garment (RMG) is the major sector for the growth of Bangladeshi economy. In the financial year 2018 the RMG industry generated US$36.66 billion which is 83.49% of the total export earnings in export. Bangladesh is the second largest Apparel exporter after China.However, repeated massive industrial accidents like the Rana Plaza incident in 2013 which took the lives of 1100 workers, indicates hazardous working conditions in the sector, and made clear that building, fire and occupational safety and health (OSH) need urgent attention. The major area of concerns are the usage of buildings which are not intended for industrial use, unauthorized extensions of buildings, lack of fire and electrical safety measures.

Justification:

Since the Rana Plaza disaster, The International Labour Organization (ILO) through its "Improving Working Conditions in the RMG Sector" project (ILO RMG project), have been providing financial and technical assistance to the Government of Bangladesh for the implementation of the National Tripartite Plan of Action on Fire Safety and Structural Integrity (NTPA) in the Bangladesh RMG sector. Under the National Action Plan an assessment of all active export oriented, ready-made garment factories in Bangladesh is to be completed.

So far more than 1500 factories have been assessed by the Accord, 900 by the Alliance and about 1549 by the National Initiative. Yet more than 1000 factories need to be assessed and many new factories are being established which need to come under safety assessment. Also the assessment should expand beyond the RMG sector and cover the Plastic Industries and Chemical Industries to ensure a safe working condition for the workers of those sectors. For this reason The Department of Inspections of Factories and Establishments (DIFE) have decided to take a new project to assess the factories which are yet to go through safety assessment process. Additional technical, human and logistical resources will be required to complete these assessments by the target date. DIFE will play a crucial role in this process by enforcing national legislation on building and worker's safety.

The assessment will identify factory buildings with a high risk of structural, fire and electrical hazard so that timely remedial actions can be taken as soon as possible. The aforementioned project aims at long-term improvement of worker safety in the garment and other industrial sectors. The underlying message in this initiative is to ensure that sustainable mechanisms are in place to prevent future tragedies and ensure safe working conditions. The assessment will seek the input of relevant stakeholders and will work closely with other Government Departments recognizing the policy and legislative provisions which have contributed to poor quality of design, construction and installation. Another component of this programme will review and make recommendations regarding changes to the building permit, occupancy and licensing process to improve oversight. It will make recommendations in light of the evidence gathered. These recommendations can cover changes or clarifications required to any part of the system or recommendations for further work that needs to carry out.

Objectives:

- To assess the Garments factory buildings which are yet to go through Fire, Electrical and Structural safety assessments in accordance with the "Guidelines of Building Assessment (Structural, Electrical & Fire) for Existing RMG Factory Buildings in Bangladesh" (From here forward will be known as "Agreed Guidelines") and Bangladesh National Building Code (BNBC).
- To determine and document non-conformities and recommend corrective actions with timeframes.
- To submit comprehensive reports to the DIFE for further action.
- To minimize the accidents at workplace and ensure safety.

Brief Description of assessment:

- The Consulting firm shall have to assess structural, fire and electrical safety in 246 RMG Factories located at Dhaka, Chattagram, Narayangonj Districtin one(01) Year from the date of commencement of the work.
- Consulting firm will ensure pre-assessment is conducted in order to gather necessary information for the site visit.
- Consulting firm will undertake site visits to review documentation and collect primary data
- Consulting firm will take necessary measurements to assess against the "Agreed Guidelines"/BNBC.
- The Consulting firm will assess factory buildings from a list of factories provided by the Project office.
- The Consulting firm shall have to send at least 1 lead engineer & 1 field engineer in team in each category per factory visit.
- The Consulting firm may have to visit 2-3 days a factory to get the proper data as per the provided format.
- The Consulting firm shall have to submit financial proposal in accordance with the proposed work plan.
- The Consulting firm shall have bank solvency of 40 Lac liquid asset/credit line/clearly bank solvency certificate with specific amount.
- For Joint venture (J-V),
    - Each firm must have valid Trade licence, TIN, VAT & Bank Solvency Certificate.
    - Experience of engineers coming from different firms cannot be sum up to reach minimum requirement as per PPR-2008, rules 54(3).
    - To fill up the financial strength, multiple firm can sum up their liquid asset/credit line as per PPR-2008.
    - Joint venture (J-V) should be formed as per PPR-2008.

- As per the need, The Name and Number of Factories changes from the Project office.
- A pre-assessment checklist will be provided by the Project office in order to obtain as much relevant information on the building before the assessment visit.

Terms:

- The consulting firm will be lead by a chief consultant having minimum 20 years of experience in relevant field or professor from BUET/reputed Engineering University having more than 20years of experience. Consulting firm shall have Minimum 2 Civil Engineers (Aggregate Experience minimum 15 Years; 01 engineer must have experience more than 10 Years), Minimum 2 Electrical Engineers with ABC Licence (Aggregate Experience minimum 12 Years; 01 engineer must have experience more than 7 Years), Minimum 2 Fire Engineers (Aggregate Experience minimum 12 Years; 01 engineer must have experience more than 7 Years). Engineers who are graduated from Mechanical or IPE background or other engineering background whom experienced in fire safety practical work of minimum 03 years or NFPA certified/International certification or Professor from reputed university in Mechanical or IPE will be treated as Fire Engineer.

- The consulting firm shall be independent of the influence of factory owners, BGMEA and other interested parties.

- The consulting firm shall have minimum 03 years experience with minimum 2 Crore unit work order and completion certificate to Government / Autonomous/ Non- Government Project in safety assessment/audit/remediation/consultancy & installation work.

- The consulting firm must have a Strong Consultants Pool and These Consultants Pool must have huge experience of Safety inspection and design background.

- The consulting firm shall have enlistment of minimum one category (Fire/Electrical/Structural) from Taskforce (Member from DIFE, BUET, FSCD,

CEI and RAJUK/CDA) which was formed as per Labour Law, Labour Rules and National Tripartite Committee (NTC) decision. For Joint Venture (J-V) participants, Lead firm have to satisfy above mentioned criteria and shall have to be formed as per PPR-2008.

- Engagement of Consulting Firm to DIFE/RCC by providing Engineers to overlook the initial assessment report or detailed report or remediation follow-up funded by Government or International organizations will be deemed as invalid Consultants due to Conflict of interest issue as per PPR-2008.

- The consulting firm also be temporary suspended from Detailed assessment or consultancy work on those factories due to Conflict of interest issue as per PPR-2008. but can be eligible for supplying products and installation work after the project completion

- ALL Engineers who are Conducting inspections must have at least five years of experience and have IEB membership.

- The consulting firm will be responsible for assessing factory buildings for structural integrity as required in "Agreed Guidelines"/BNBC.
- The consulting firm will consult and discuss with the representatives of the Project office on non-conformities and recommended actions with timeframes.
- The consulting firm will provide a detailed presentation to the designated representative of Project office on details of the methodology and data collection format within two week of contract signing.
- The consulting firm will obtain as much relevant information on the factory before the inspection visit through a pre-assessment process.
- Color coded classification system shall be used to categorize each factory according to the priority of follow-up actions required.
- Details of the methodology, data collection format, and a sample report will be provided by the Project office for review before commencement of assessments.

- The consulting firm will obtain as much relevant information on the building before the inspection visit through a pre-assessment process

    - The consulting firm will explain to the factory owner/manager the survey process; including the requirement of the survey team to take column impact samples and other testing that might disturb employees, so that the factory owner/manager can explain to employees beforehand.
    - The pre-assessment should highlight key questions that will be asked of the factory owner/ manager so that they can prepare answers, documents and drawings in advance.
    - The pre-assessment should identify the requirements for proper as-built drawings and loading plans (possibly with a sample for guidance)

- A sample report will be provided by the designated representative of Project office for review within one week of contract signing and before commencing assessments.
- Arrangements with the factories, pre-assessment, travel to and from the factories and Health and Safety requirements for the assessment team will be addressed by the consulting firm inspection teams.

- The consulting firm will carry out an on-site structural/fire/electrical safety assessment of each factory under the remit of the national initiative as stipulated in the "Agreed Guidelines"/BNBC.

- The consulting firm will plan, organize and manage assessments to be available to cover the assessment schedule developed in consultation with designated representative of the Project office.

- Before commencing with assessments the consulting firm will ensure the engineers are properly briefed on the approach and methodology for the inspections.

- The consulting firm shall take all necessary measurements and calculations in order to properly determine compliance and to correctly recommend corrective actions.

- The consulting firm shall make calculations based on worst case scenarios if measurements/ information cannot be verified during the site inspection i.e. 1% reinforcement and brick aggregate for structural safety assessment.

- If calculation results in the determination of a building as belonging to the RED category (immediate evacuation required). The consulting firm wills immediate relay this information to the Head of procuring Entity for further action.

- The consulting firm shall use agreed concrete strengths guided by Experts of BUET/KUET/CUET/RUET to undertake an initial assessment of the column working stresses:

- The consulting firm will immediate relay any information which indicate a high and unacceptable risk to life safety to Head of procuring Entity for further action.

- The consulting firm will, based on the data collection sheets during the inspection visits, be precise and detailed in describing non-compliances and formulating corresponding remedial actions including timeframes for completion.

- The assessment report must be completed for each factory within 05 days of the date of assessment.

- The raw data from each assessment will be submitted to the Project office within 5 working days of the date of assessment for review.

- After review, the consulting firm shall immediately submit the reports to the Project office.

- The consulting firm will also provide a full and updated list of all buildings assessed, as well as of all factories assessed that are located in these buildings, to the Project office on a weekly basis.

- The consulting firm will provide a report of findings, recommendations for corrective actions where required and timeframes where necessary for each factory building.

- The consulting firm will provide a monthly update to the DIFE on the findings of the assessment and the requirements of the corrective action plans.

- The consulting firm will participate in meetings with government officials, workers and employer unions along with Experts from BUET or Reputed Engineering University in order to explain details of the findings.

- Whatever said in abovementioned topics, the overall experience of the firm mainly depend on the Consultants experience, and the written willingness of the consultants in favour of the firm. The consultants will be highly appreciated and valid who are recruited/vetted by Professors from Reputed Engineering University.
- Every report submitted by consulting firm must have to be properly sealed and signed by the Lead Engineers who will be recruited/vetted by Professors from Reputed Engineering University.
- The reputation and experience of engineers can be reviewed based on Government certification or Consultants from Reputed University i.e. BUET or NFPA Certified or other international certification or the practical Experience on Accord, Alliance or RCC will be highly encouraged.
- The Project office also may hire expert from Taskforce Body to recheck the quality assurance process and the consulting firm can bear the reimbursable expense.

Materials provided by Client:

Following materials will be provided to consulting firm from Project office:

- Checklist for Structural Safety Assessment.
- Checklist for Fire Safety Assessment.
- Checklist for Electrical Safety Assessment.
- Report format
- CAP format

Deliverables or expected outcomes:

	DELIVERABLE	DATE
Deliverable A		
	Inception presentation focus on: • Methodology • Instruments for collecting data. • Sample outline of the assessment report.	Before commencing assessments.
Deliverable B		
	Coordination meetings/updates: Monthly meeting to discuss progress and address any issue. Weekly e-mail update on activities	Monthly weekly
Deliverable C		
	• Reports of factories assessed • Reports reviewed and revised if necessary • All finalized reports submitted to the DIFE • Relevant details of finalized reports transferred to the public reporting format and submitted to the DIFE	

Additional measures:

Surveys:

Item	Recommendation
Visual Inspections	Visual inspections will not suffices the primary means of determining structural integrity. Proper testing should be done to ensure structural integrity.
Easting and Northings	The location of the factory should be noted using Easting and Northing coordinates. This information would be useful if the survey data was to be pulled into a GIS database/map.
Ferro-scanner	The contractor will use Ferro-scanners to determine the condition of the rebar.
Aggregate Verification	The contractor will use geological hammer to expose concrete to enable visual inspection of aggregate or assume brick chip aggregate if not verified on site.
Non-Standard Areas and Progressive Collapse review	The surveyors should be led by an experienced Structural Engineer(at least 10 years' experience)who looks particularly at non-standard areas particularly with high loads(tanks, storage) and imagines extreme load conditions and scenarios with an eye on potential progressive collapse scenarios.
Areas of extension over original	The investigation of the high likelihood of vertical and horizontal extensions needs to be a key part of these assessments and again questions of overloading and potential progressive collapse need to be considered.
Survey areas	• It is recommended that the contractor assesses the perimeter of the building for signs of deterioration. The backs of buildings are often not well maintained or covered. • Where factories being surveyed do not occupy all floors it is recommended that all areas of the building are visited.

Reporting:

Item	Recommendation
Working Stress Calculations	The contractor to highlight key columns and carry out simple calculations of working stresses. Calculated working stresses should be compared to data set values and trigger points developed (see below) that may lead to the request for a Detailed Engineering Assessment (DEA)
Summary	The contractor to include "Summary" section at the start of each report.

	Note: this summary may be the text that is publically viewable and needs to be written with this in mind.
Color-coding Actions with Timeframe	All reports to be given a color designation based on urgency of required actions The contractor to include an"Actions with Timeframe" section to the end of all reports. Actions should be based on 3time scales namely: 1. Immediate 2. Within 6 weeks 3. Within 6 months
Trigger points for column stresses	The contactor to use color coding triggers -Columns with FOS better than 1.86 would be GREEN -Columns with FOS between 1.86 and 1.5 would be YELLOW and trigger core testing -Columns with FOS between 1.50 and 1.25 would be AMBER and would trigger a DEA -Columns with FOS below1.25 should be carefully reviewed, the loading can be reduced to that observed (The minimum load on any floor should be1kN/m² or 20psf) If FOS is still below 1.25 then RED and evacuation is considered. Expert consideration of load reduction/removal, age of building etc.will come into play at this point. Color-codes are linked to timeframes for action: GREEN–No immediate actions YELLOW–Actions within 6 months AMBER–Action or DEA within 6 weeks RED–Immediate further assessment and possible evacuation
DEA	Reports that call for a Detailed Engineering Assessment should be clearly labeled on report and should clearly request this being undertaken within 6 weeks in the summary and action sections of the report plus a DEA stamp on the front of the report. Column working stresses in Amber & Red trigger points Concerns with extensions,lateral system, flat plate punching capacity, slender columns should all be considered in line with theTripartite Guidelines and may be trigger points for DEA's. State of documentation and approvals should also influence DEA trigger.
Fire safety systems	Autonomy and/or inter-dependency of all fire safety systems with other tenants must be identified. The presence or otherwise of code compliant fire safety systems must be identified, but performance testing of these systems to assess full code compliance will not be

	required during these inspections. Where systems need to be upgraded or replaced then the report should note that performance testing of the installation will be the responsibility of the systems contractor.
ColourCoding Actions with Timeframe	All reports to identify priority actions and a colour designation based on timeframes provided to implement priority actions the contractor to add an "Actions with Timeframe" section to all reports.(Fire and Electrical) Actions should be based on 3 timescales namely: 1. Immediate 2. Within 6 weeks 3. Within 6 months
Certificatesand Previous Assessments	The contractor should not assume the existence of approvals or certificates validates the safety of the building.Reports should referenceprevious assessments have been done and if actions were taken, if not then this needs to be seriously noted

Quality Assurance process

- **Step 1** Surveyors review each other's reports.
- **Step 2** Any contentious reports and a selection of other reports would be reviewed and checked under the direction of the lead consultants.
- **Step 3** 100% of Red Category; 50% of Red/Amber; 5% of Amber; 5% of yellow; and 3% of green reports will be submitted to the Project office for reviewed by Lead consultants.
- **Step 4** Issue reports to Project office.

Institutional Arrangements:

After completion of the project, DIFE will arrange workshop with all factories regarding the findings of the preliminary assessment and take decisions for further actions.

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আব্দুল মুমিন
সহকারী মহাপরিদর্শক (সেফটি)
কলকারখানা ও প্রতিষ্ঠান পরিদর্শন অধিদপ্ত
আইডি নং-৪০৮, প্রধান কার্যালয়
শ্রম ও কর্মসংস্থান মন্ত্রণালয়

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ডাঃ সৈয়দ আবুল এহসান
যুগ্ম মহাপরিদর্শক (চলতি দায়িত্ব)
কলকারখানা ও প্রতিষ্ঠান পরিদর্শন অধিদপ্তর
গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
প্রধান কার্যালয় ঢাকা।

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শিবনাথ রায়
(অতিরিক্ত সচিব)
মহাপরিদর্শক
কলকারখানা ও প্রতিষ্ঠান পরিদর্শন অধিদপ্তর।