Uttarakhand State Disaster Management Authority

TENDER DOCUMENT
(SEISMIC RETROFITTING OR IDENTIFIED SCHOOL BUILDINGS)

BACKGROUND

School buildings are important structures and their collapse can lead to massive set back and trauma to the affected community. Large number of students were killed in both Muzaffarabad and Sichuan earthquakes. 7.6 magnitude Muzaffarabad Earthquake of 8th October, 2005 took toll of 74,500 human lives. 7,669 schools in Pakistan occupied Kashmir and North West Frontier Province were destroyed in this incidence killing 18,100 students (24 percent of the dead). 7.9 magnitude Sichuan Earthquake of 12th May, 2008 killed 90,000 people of which 5,535 (6 percent of the total) were students.

Besides causing trauma to the earthquake-affected population collapse of school buildings adversely affects post-earthquake relief and rescue efforts as school buildings often serve as community shelters and relief centers.

Earthquake is a harsh reality for any tectonically active region. Constraints in earthquake prediction amplify the importance of effective planning, preparedness and mitigation for saving lives and property. Assessment of seismic vulnerability of all the school buildings is therefore a necessary precondition for realistic planning and effective mitigation. Based on this assessment both structural and non-structural mitigation measures can be undertaken to ensure safety of the schools during any seismic event.

Seismic retrofitting of buildings is recognised as being a successful strategy for reducing losses in the event of an earthquake. The identified building is subjected to the following steps before the initiating the process of seismic retrofit.

(i) Screening: Screening entails assessing buildings to ascertain their level of seismic risk following a simplified procedure with main objective to determine if the building should or should not be selected for a more detailed investigation. Major factors to determine the screening score of a building are building location, soil condition, type and uses of the structure, obvious building irregularities, presence and absence of non-structural hazards, building age, building importance and occupancy characteristics.

(ii) **Evaluation:** In the evaluation process, a detailed investigation is performed on shortlisted buildings with medium to high priority as a result of the screening exercise. The objective of a performance evaluation is to identify the vulnerabilities of the structural and non-structural systems and their components to seismic load. Cost implications and Estimate has to be submitted for each building which need to be retrofitted.

(iii) Design: All structural designing of the building are done on the basis of Indian Standard codes like IS 456-2000, IS 13920, IS and IS 1893 etc, because building codes are sets of regulations governing the design, construction, alteration, and maintenance of structures. They specify the minimum requirements to adequately safeguard the health, safety, and welfare of building occupants. The main purpose of building codes is to protect public health, safety and general welfare as they relate to the construction and occupancy of buildings and structures. Adoption and enforcement of up-to-date building codes is critical to reduce the community's risk to earthquakes. Evaluating older buildings and retrofitting structural and non-structural components also are critical steps. Residential and commercial building codes provide a comprehensive set of minimum health, safety and energy standards for the design, construction and maintenance of new houses and buildings, and major renovations. They set an understandable and reliable floor for construction practices that reduce our vulnerability to a wide range of hazards.

(iv) Retrofit: Seismic retrofit becomes necessary if it is shown that, through a seismic performance evaluation, the building does not meet requirements up to the current

building code and may suffer severe damage or even collapse during seismic event. The retrofitting of a building requires an appreciation for the technical, economic and social aspects of the issue in hand. Change in construction technologies and innovation in retrofit technologies present added challenge to structural engineers in selecting a technically, economically and socially acceptable solution.

Methods of seismic retrofitting: Methods of retrofitting may be grouped into the following classes:

• Stiffness reduction

• Ductility increase

• Damage controlled structures

• Composite materials

Indian Standard Codes for earthquake safe design of structures: Following codes shall be use for designing and retrofitting of the buildings:

- IS: 1893-2002 (part-1) Criteria for Earthquake Resistant Design of Structures (Part 1 : General Provision and Buildings) – Code of Practice
- IS: 4326-1993 Earthquake Resistant Design and Construction of Buildings – Code of Practice
- IS: 13920-1993 Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces – Code of Practice
- IS: 13935-1993 Repair and Seismic Strengthening of Buildings – Guidelines
- IS: 13828-1993 Improving Earthquake Resistance of Low Strength Masonry Buildings – Guidelines
- IS: 13827-1993 Improving Earthquake Resistance of Earthen Buildings – Guidelines.

Retrofitting Cost of Buildings: Most of the buildings to be retrofitted are either load bearing masonry wall or confined masonry buildings. The retrofit cost for each building is less than 30% of the present cost of such buildings. If the retrofitting cost of the building works out to be higher than 30% of the present cost of such building,

the building shall be recommended for demolition taken up for new construction. The proposed methods for retrofitting of buildings shall be based on BIS, FEMA and other International codes.

DETAILS OF THE ASSIGNMENT

Title: Seismic retrofitting ofoneidentified school building each in Rudraprayag and Bageshwar districts of Uttarakhand

Reference No. 25 /DMMC/XIV-369 (2012) TC Date: 29.05.2017

On behalf ofState Disaster Management AuthorityDMMC invites financial and technicalbids, in separate sealed envelopes, from experienced firms for seismic retrofitting of one identified school building each in Bageshwar and Rudraprayag district. The details describing the condition of these buildings are as given below.

1. Government Inter College, Pitrdhar, Agastyamuni (Rudraprayag): GIC Pitrdhar is located in Augustmuni Block of Rudraprayag District. The building is owned by the Education Department and consists of 07 blocks.

Block A	GIC Pitrdhar, Augustmuni	Masonry Building
Block B	GIC Pitrdhar, Augustmuni	Masonry Building
Block C	GIC Pitrdhar, Augustmuni	Masonry Building
Block D	GIC Pitrdhar, Augustmuni	Masonry Building
Block E	GIC Pitrdhar, Augustmuni	Masonry Building
Block F	GIC Pitrdhar, Augustmuni	Masonry Building
Block G	GIC Pitrdhar, Augustmuni	Masonry Building

Total area of the building is 379.133 sq. m.

1) **Details of Block A are as given below.**

Number of stories:	1
Construction year:	2005
Building wall structure type:	CC Block
Building plan dimensions:	Length: 11.40 m Width: 5.17 m
Dampness/water logging condition:	Dampness in the wall and slab observed.
Distress in building:	Major shear cracks on walls and above door and window, Major cracks on walls and slab joint, major cracks on beams

Condition of Block A is very bad.

2) The details of Block B are as summarized below.

No of stories:	1
Construction year:	2003
Building wall structure type:	Brick masonry in cement mortar
Building plan dimensions:	Length: 12.50 m Width: 5.66 m
Roofing material:	RCC Slab
Dampness/water logging condition:	Dampness in wall and slab
Distress in building (if any):	Cracks on walls, cracks on walls and slab joint, cracks above lintel level

3) Block C details are as given below.

Construction year:	1997
No of stories:	1
Building wall structure type:	Brick masonry in cement mortar
Building plan dimensions:	Length: 18.40 m Width: 4.55 m
Roofing Material:	RCC Slab
Distress in building (if any):	Major shear cracks on walls, slab reinforcement is visible and rusted, walls are damaged, deflection of slab

Comments of observer on structural condition: Dampness in wall, major cracks on walls.

Building condition is very bad

4) Block D details are as summarized below.

Construction year:	1997
No of stories:	1
Building wall structure type:	CC Block
Building plan dimensions:	Length: 5.30 m Width: 4.65 m
Roofing material:	RCC Slab

Distress in building (if any): Yes.

Cracks in walls and slab joint and cracks in walls

Comments of observer on structural condition:

Some cracks observed, and dampness is observed in the wall and slab.

5) Details of Block E are as summarized below.

Construction year: 2005

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 6.80 m Width: 4.60 m

Roofing material: RCC Slab

Distress in building (if any): Yes, cracks in walls, cracks on walls and slab joint, backside wall is damaged.

Comments of observer on structural condition:

Dampness and minor cracks visible in the wall.

6) Details of Block F are as given below.

Construction year: 1994

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 6.00 m Width: 4.80 m

Roofing material: RCC slab

Distress in building (if any): Deflection of slab (extra internal wall is provided to prevent further deflection), slab reinforcement is visible and rusted, cracks on walls and cracks on walls and slab joint

Comments of observer on structural condition:

Leakage from slab and dampness.

7) Details of Block G are as given below.

Construction year: 1999

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 12.00 m Width: 6.75 m

Roofing material: RCC slab

Summary of the GIC Pitrdhar building

Sl. No.	Block	Area of building (sq. m.)	Retrofitting Status	Remarks
1.	A	58.938	Required	Major cracks in walls
2.	B	70.75	Required	Cracks in walls
3.	C	83.72	Required	Wide cracks in walls, wall is damaged
4.	D	24.645	Required	Huge cracks is shown in the wall
5.	E	31.28	Required	Backside wall is damaged
6.	F	28.80	Required	Deflection in slab, cracks in walls and slab junction
7.	G	81	Required	Reinforcement of slab is visible and rusted, cracks on walls above lintel level

Distress in building (if any): Cracks on walls and slab joint, slab and beams reinforcement is visible and rusted, cracks on walls above lintel level, cracks on walls.

Comments of observer on structural condition: Building condition is not good and no earthquake measure feature are provided.

Photos of various distress in school building:

Backside wall is damaged

Major cracks in wall and beam

Wide cracks in walls and deflected beam

Shear cracks in beam

Government Inter College, Vajula, Garur (Bageshwar): GIC Vajula is situated in Garud Block of Bageshwar whose latitude and longitude are 29.94768934 N, 79.62368207 E. Building is owned by Education Department and consists of 08 blocks.

Block A	GIC, Vajula, Garud	Masonry Building (Stone)
Block B	GIC, Vajula, Garud	RC Building
Block C	GIC, Vajula, Garud	Masonry Building
Block D	GIC, Vajula, Garud	RC Building
Block E	GIC, Vajula, Garud	RC Building
Block F	GIC, Vajula, Garud	RC Building
Block G	GIC, Vajula, Garud	RC Building
Block H	GIC, Vajula, Garud	RC Building

Total area of the building is 2856.5 sq.m.

1) **Block A is constructed in the year 1965, whose details are as given below**

No of stories:	2
Building wall structure type:	Ashlar stone in lime surkhi
Building plan dimensions:	Length: 62.60 m Width: 20.00 m
Construction type:	Non-engineered construction.
Dampness/water logging condition:	Water coming from the roof during the raining season and dampness in the wall observed.
Distress in building:	Yes, cracks in all wall, very large cracks in each wall, near about 6 cm (in width) cracks in wall.

Condition of Block A is very bad.

2) Details of Block B are as given below.

No of stories:	1
Construction year:	2005
Building wall structure type:	Brick masonry in cement mortar
Building plan dimensions:	Length: 3.70 m Width: 4.50 m

Dampness/water logging condition: Dampness in wall

Distress in building (if any): Yes, some minor cracks observed

3) Details of Block C are as given below.

Construction year: 2005

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 3.70 m Width: 4.50 m

Roofing material: RCC Slab

Distress in building (if any): Yes, some minor cracks observe

Comments of observer on structural condition: Dampness in wall, minor cracks observed.

Building Condition is very bad.

4) Block D details are as following.

Construction year: 2005

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 17.30 m Width: 5.70 m

Roofing material: RCC slab

Distress in building (if any): Yes, some minor cracks observer. There are huge cracks in the Lintel level of the building.

Comments of observer on structural condition: Some minor cracks observe, and dampness observes in the wall.

5) Details of Block E are as given below.

Construction year: 2005

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 15.50 m Width: 6.50 m

Roofing material: RCC slab

Distress in building (if any): Yes, some minor cracks in the wall below roof slab.

Comments of observer on structural condition: Dampness and minor cracks visible in the wall.

6) Details of Block F are as given below.

Construction year: 2005

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 6.30 m Width: 4.60 m

Roofing material: RCC slab

Distress in building (if any): Some minor cracks observe in the wall

Comments of observer on structural condition: Dampness in the wall, and some minor cracks in the wall, and chances of slope failure.

7) Details of Block G are as given below.

Construction year: 2005

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 12.90 m Width: 5.40 m

Roofing material: RCC slab

Distress in building (if any): Cracks below the roof and hair cracks in walls

Comments of observer on structural condition: Dampness and hair cracks in the structure.

8) Details ofBlock G are as given below.

Construction year: 2005

No of stories: 1

Building wall structure type: Brick masonry in cement mortar

Building plan dimensions: Length: 4.00 m Width: 5.30 m

Roofing material: RCC slab

Distress in building (if any): None

Comments of observer on structural condition: Structure may get damage due to differential settlement over time.

Summary of the GIC Vajula building.

Sl. No.	Block	Area of building (Sq. m.)	Retrofitting Status	Remarks
1	A	2504	Required	Seismic retrofitting required
2	B	16.65	Not required	----------
3	C	16.65	Required	Cracks near the door frame
4	D	98.61	Required	Huge cracks is shown in the wall
5	E	100.75	Required	Cracks in wall below roof slab
6	F	28.98	Not required	Maintenance work
7	G	69.66	Required	---------
8	H	21.20	Not required	Mid day meal room

Photos of various distress in school building:

Lintel Band not provided

Major Crack above window

Irregularity in main Building.

Cracks below the slab

SCOPE OF WORK

The firmshall have the objective of assessingseismic performance of the identified existing structures ofthe school buildingsand undertake seismic retrofitting of thesebuildings in accordance with specifically prepared retrofitting plan. The following activities are enlisted to be carried out:

1. To developed retrofitting design of the identified school buildings.
2. To propose cost effective solution for retrofitting of critical infrastructures.
3. To get approval for retrofitting design from CBRI Roorkee.
4. To undertake retrofitting of these buildings in accordance with the approved retrofitting plan.
5. To document the retrofitting procedure and prepare detail report.

THE SHORTLISTING CRITERIA

1. The firm should have experience ofcarrying out seismic retrofitting of existing buildings of different types mainly masonry and RCC buildings.
2. The firm should have experience of generating earthquake resistant design of existing building.
3. The firm should have experience of earthquake resistant construction related consultant services for at least 3 years.
4. The firm should demonstrate that they have enough technical capacity (including personnel) in handling suchprojects;
5. The firm should have prior working experience in similar kind of projects.
6. Firm should be capable enough to generate seismic retrofitting design and retrofit the structure.
7. The firms should have an annual turnover of at least INR 50.00Lakh in any year of the last 3financial years.

The technical bid must include:

- Introductory letter on letter head (with complete contact details – name of contact person, mailing address, telephone, fax, email etc.) expressing the willingness for the project and explaining how the firm is best suited to conduct the study.
- Organizationprofile.
- Last three years audited annual report and three years financial statement.
- A presentation in hard copy having the past experiences of the firm on all projects mention aboveand financial turnover.
- Short note along with photographs on the similar projects implemented by the Consultancy Firm pertaining to the short listing criteria.
- The bid should contain sufficient supporting documents to substantiate the claim of the Consultant towards their qualification as per the shortlisting criteria.

The firms may associate with each other in the form of a joint venture or association. The submission should clearly state the nature of the Joint Venture or Association. Information regarding technical competence of the firm must be provided in the format as given in the Annexures below.

Annexure - I

STRUCTURED QUESTIONNAIRE FOR THE FIRM

(TO BE SUBMITTED ALONG WITH TECHNICAL BID)

General Particulars of the firm

Name of the firm	
Registered Address	
Phone No:	
Email id:	
Name of the Contact Person for this bid	
Phone no. of the Contact person for this bid	
Email id of the Contact person for this bid	
Branch offices if any	
Date of establishment of the firm	
Number of full time partners Fellow	

Associate	
Number of full time qualified staff	
Number of other staff who are semi qualified/unqualified	

Annexure – II

Financial Particulars of the firm

Financial Year	Turnover from Civil Engineering works	Turnover from other Activities	Total Turnover

"Turnover" would mean the professional fee earned excluding service tax and travelling, if billed separately.

Annexure – III

Partners Brief Profile

Name of Partner/ M.No.	Age	Associate / Fellow	Years of post-qualification experience	Qualification	Years of experience as signing partner	Name of Clients handled	Number of years associated with the firm (post qualification)

Annexure – IV

Full Time Qualified Staff Brief Profile

Name of Staff/M. No.	Age	Years of experience	Qualification	Number of Years associated with the firm (post qualification)	Brief nature of work done

Annexure – V

Other Staff Brief Profile

Name of Staff	Age	Years of Experience	Qualifications	Number of Years Associated with the firm	Assignments where the staff has worked with year

Annexure – VI

Relevant assignments – Last five years

Name of Project /Agency Audited	(1) Funded by Multilateral / Bilateral funding agency;[(2) Agencies implementing government	Client Name	Nature of Work	Year of Work Done	Partner	Project Expenditure	Professional fees

	projects (other than above); **Or (3) Public sector undertakings in the same sector Please specify 1, 2, 3**						
	(3)						

FINANCIAL PROPOSAL

Along with the technical bid the firm is required to provide in a separate sealed envelope detailed financial bid depicting itemwise details of the retrofitting works and costs thereof separately for both the schools. A summary sheet depicting summary of retrofitting cost of both the schools should also be provided.

Financial bid of only the firms fould suitable on the basis of the Technical Bid would be entertained.

It may be noted that the tender is for undertaking seismic retrofitting of (i) Government Inter College, Vajula in Garud Block of Bageshwar district and (ii) Government Inter College, Pitrdhar in Augustmuni Block of Rudraprayag district. Details of these schools are provided in the sections above. The firm wouldbe required to carry out the following activities under this work and the Financial Bid should take note of the same:

a. Detailed assessment of the above identified buildings for seismic retrofitting as per IS Codes.
b. Seismic retrofitting designing, preparation of structural drawing and strengthening solution of the above identified buildings as per IS Codes.
c. Getting the retrofitting scheme approved by CBRI Roorkee.
d. Undertaking retrofitting works of the various blocks of these two school buildings in accordance with the approved retrofitting scheme. A Technical Committee would oversee and ensure implementation of work in accordance with the approved scheme.
e. Detailed documentation of the retrofitting work and preparation of report thereof.

The financial bid should also provide a timeline for undertaking of the retrofitting works depicting important milestones.If required, the representatives of the firm may visit the identified schools before submitting their bid.

Technical bid with all filled annexures along with the financial bid (in separate sealed envelopes on which Technical / Financial bid should be clearly mentioned) must be delivered in a document form (hard copy) at the address given below (in person, by post) latest 1200 hrs on 8th June, 2017. The bids would be opened the same day at 1600 hrs in the presence of the representatives of the firms.

Executive Director

Disaster Mitigation and Management Centre (DMMC)

Uttarakhand Secretariat, Rajpur Road,

Dehradun

Tel: 0135-2710232, 2710233 Fax: 0135-2710199

E-mail dmmcuttarakhandsec@gmail.com

Website: www.dmmc.uk.gov.in