

**INVENTORY OF SCHOOL INFRASTRUCTURE - GLOBAL PROGRAM FOR SAFER SCHOOLS**
**MODULE 2. BUILDING STRUCTURE**

Select a blue box; Report data in white boxes and underlined section; Select one or several grey boxes to report complementary information  
 All answers in this form shall refer to the structure and components in their present condition including all possible previous retrofitting works

**DETAILED INFORMATION (BUILDING LEVEL)**

|  |             |
|--|-------------|
|  | Building ID |
|--|-------------|

Are architectural/structural drawings available? If yes, collect it as a hard copy or take a photo.

|  |   |
|--|---|
|  | Yes, take a hard copy or take a good resolution photo |
|  | No  |

If no, who has the architectural/structural drawings?

|  |                |
|--|----------------|
|  | Specify: _____ |
|  | Don't know     |

**OU P0. BUILDING CATEGORY**

|  |                           |                      |
|--|---------------------------|----------------------|
|  | <b>LBM</b>                | Load bearing masonry |
|  | <b>RC</b>                 | Reinforced concrete  |
|  | <b>SF</b>                 | Steel framed         |
|  | <b>TF</b>                 | Timber framed        |
|  | <b>Mixed Systems</b>      |                      |
|  | <b>Under Construction</b> |                      |
|  | <b>OTHER</b>              | Specify: _____       |

**OU P1. MAIN STRUCTURAL SYSTEM**

If LBM:

|  |                 |   |
|--|-----------------|---|
|  | <b>A</b>        | Earthen blocks or compressed stabilized soil blocks in mud mortar |
|  | <b>UCM/URM1</b> | Dry rubble (or field) stone masonry                               |
|  | <b>UCM/URM2</b> | Rubble (or field) stone in mud mortar                             |
|  | <b>UCM/URM3</b> | Dressed stone in mud mortar                                       |
|  | <b>UCM/URM4</b> | Rectangular block (brick, concrete block) in mud mortar           |
|  | <b>UCM/URM5</b> | Rubble (or field) stone in cement mortar walls                    |
|  | <b>UCM/URM6</b> | Dressed (or field) stone in cement mortar                         |
|  | <b>UCM/URM7</b> | Rectangular block in cement mortar                                |
|  | <b>CM</b>       | Rectangular block in cement mortar with RC confinement            |
|  | <b>RM</b>       | Rectangular block in cement mortar with steel reinforcement       |
|  | <b>SFM1</b>     | Lightweight gravity steel frame with URM walls                    |
|  | <b>SFM2</b>     | Lightweight gravity steel frame with RM, CM or precast walls      |
|  | <b>TFM</b>      | Lightweight gravity timber frame with URM walls                   |
|  | <b>OTHER</b>    | Specify: _____  |

G1. Minimum 1 photo for each building side.

If RC:

|                          |       |
|--------------------------|-------|
| <input type="checkbox"/> | RC1   |
| <input type="checkbox"/> | RC2   |
| <input type="checkbox"/> | RC3   |
| <input type="checkbox"/> | RC4   |
| <input type="checkbox"/> | RC5   |
| <input type="checkbox"/> | RC6   |
| <input type="checkbox"/> | OTHER |

Reinforced concrete moment frame with/without in-fill walls that do not contribute to lateral stiffness  
 Reinforced concrete frame with in-fill walls as stiffening element  
 Reinforced concrete short column frame  
 Reinforced concrete combined or dual system  
 Non-engineered reinforced concrete frame  
 Prefabricated reinforced concrete system  
 Specify: \_\_\_\_\_

If SF:

|                          |       |
|--------------------------|-------|
| <input type="checkbox"/> | SF1   |
| <input type="checkbox"/> | SF2   |
| <input type="checkbox"/> | SF3   |
| <input type="checkbox"/> | OTHER |

Steel moment resisting framed structure with masonry infill walls  
 Steel moment resisting framed structure with lightweight infill panels  
 Steel moment resisting framed structure with braces  
 Specify: \_\_\_\_\_

If TF:

|                          |       |
|--------------------------|-------|
| <input type="checkbox"/> | TF    |
| <input type="checkbox"/> | OTHER |

Timber frame  
 Specify: \_\_\_\_\_

If mixed systems:

|                          |        |
|--------------------------|--------|
| <input type="checkbox"/> | LBM/RC |
| <input type="checkbox"/> | LBM/SF |
| <input type="checkbox"/> | LBM/TF |
| <input type="checkbox"/> | RC/SF  |
| <input type="checkbox"/> | RC/TF  |
| <input type="checkbox"/> | SF/TF  |
| <input type="checkbox"/> | OTHER  |

Specify: \_\_\_\_\_

If under construction:

Others (specify): \_\_\_\_\_

If other:

Others (specify): \_\_\_\_\_

**OU P2. HEIGHT RANGE**

|                        |
|------------------------|
| <input type="text"/>   |
| <input type="text"/> m |

No. of stories  
 Total height

**OU P3. SEISMIC DESIGN LEVEL**

Previous work is needed to inform this parameter (collect technical drawings or MoE/local expert experiences on local construction practice) .

Building construction year (aprox.)

Construction responsible

|                          |                             |
|--------------------------|-----------------------------|
| <input type="checkbox"/> | CR1: National government    |
| <input type="checkbox"/> | CR2: Subnational government |
| <input type="checkbox"/> | CR3: NGO or donors          |
| <input type="checkbox"/> | CR4: Community              |
| <input type="checkbox"/> | CR0: No information         |
| <input type="checkbox"/> | OTHER                       |

Specify: \_\_\_\_\_

G3. Minimum 4 photos about the main lateral load resisting system, their connections, sizes etc.

**Presence of seismic enhancement measures:**

If LBM, LBM/RC, LBM/SF, LBM/TF:

|  |   |
|--|---|
|  | Evidence of internal vertical and/or horizontal reinforcement in masonry walls (already a typology i.e. RM)                   |
|  | Evidence of vertical and/or horizontal confining RC elements at distances no more than about 4 m (already a typology i.e. CM) |
|  | Presence (and connection to wall) of gravity columns (timber, steel, RC) at corners   |
|  | Presence of horizontal ring beam (timber, RC or steel) at floor level for box action  |
|  | Presence of horizontal ring beam (timber, RC or steel) well connected to the floor/roof structure                             |
|  | Presence of sill band at window level   |
|  | Presence of light material gable walls (wooden planks or CGI sheet) in LBM buildings  |
|  | Presence of ties, anchors in the wall to floor/roof connection  |
|  | Presence of quoin in masonry structures at the corners  |
|  | Presence of reinforcements at the corner region (for stronger cross walls connection)   |
|  | Buttress in masonry walls with long panel lengths   |
|  | Others (specify): _____   |
|  | None  |

If RC, LBM/RC, RC/SF, RC/TF:

|  |   |
|--|---|
|  | Infill walls or parapets or facade components isolated from the structure   |
|  | Infill walls or parapets or facade components with evidence of internal reinforcement or confinement or effective connection to the structure |
|  | Stronger columns with respect to beams  |
|  | Columns with minimum dimension greater or equal to 30 cm.   |
|  | Others (specify): _____   |
|  | None  |

If SF, LBM/SF, RC/SF, SF/TF:

|  |  |
|--|--|
|  | Vertical and horizontal continuous elements with strong cross sections and good vertical and horizontal alignment                            |
|  | Presence of uniformly distributed braces with strong cross sections (no wrapping or excessive deflections)                                   |
|  | Connections with engineering treatment (sufficient number of bolts and adequately distributed, continuous and good quality of welding, etc.) |
|  | Others (specify): _____  |
|  | None   |

If TF, LBM/TF, RC/TF, SF/TF:

|  |   |
|--|---|
|  | Vertical elements well distributed, uniform and strong cross section, and good vertical alignment                             |
|  | Presence of uniformly distributed braces  |
|  | Good quality of connections and presence of hold downs and specific connecting devices such as steel plates, bolts or similar |
|  | Others (specify): _____   |
|  | None  |

**P4. DIAPHRAGM TYPE**

**Roof**

Type of structure

|  |   |
|--|---|
|  | RC solid slab                                 |
|  | RC two way joist slab                         |
|  | RC one-way joist in longitudinal direction    |
|  | RC one-way joist in transversal direction     |
|  | Timber framed structure without concrete slab |
|  | Steel framed structure with concrete slab     |

G4. Minimum 4 photos: 1 for typical floor, 1 for floor connection; 1 for roof, 1 for roof connection

|  |  |
|--|--|
|  | Steel framed structure without concrete slab |
|  | Other (specify): _____                       |

Connection to lateral load resisting system

|  |                                       |
|--|---------------------------------------|
|  | Monolithic or embedded                |
|  | Resting over lateral resisting system |
|  | Other (specify): _____                |

Covering

|  |       |
|--|-------|
|  | Heavy |
|  | Light |

**Floors**  
Type of structure

|  |  |
|--|--|
|  | RC solid slab                              |
|  | RC two way joist slab                      |
|  | RC one-way joist in longitudinal direction |
|  | RC one-way joist in transversal direction  |
|  | Timber structure                           |
|  | Steel structure                            |
|  | Other (specify): _____                     |

Connection to lateral load resisting system

|  |                                       |
|--|---------------------------------------|
|  | Monolithic or embedded or anchored    |
|  | Resting over lateral resisting system |
|  | Other (specify): _____                |

**OU P5. STRUCTURAL IRREGULARITY**

**Horizontal Irregularity**

|  |                        |
|--|------------------------|
|  | Rectangular            |
|  | L-shaped               |
|  | T-shaped               |
|  | H-shaped               |
|  | U-shaped               |
|  | Asymmetrical           |
|  | Other (specify): _____ |

**Vertical Irregularity**

|  |  |
|--|--|
|  | Soft story                               |
|  | Variation in story height                |
|  | Variation in story mass and/or stiffness |
|  | Setback irregularity                     |
|  | None                                     |

**1st Story : foot print**

|  |                        |
|--|------------------------|
|  | Total length, X (m)    |
|  | Total length, Y (m)    |
|  | Total no. of bays in X |
|  | Total no. of bays in Y |

**OU P6. LBM: WALL PANEL LENGTH, RC: SPAN LENGTH**

G6. Minimum 2 photos for the panel with maximum length: 1 external + 1 internal

**LBM, LBM/RC, LBM/SF, LBM/TF:**

|  |   |
|--|---|
|  | m |
|  | m |
|  | m |

Maximum wall length between adjacent restricted borders  
Wall thickness (if varying, specify)  
Maximum bay length between columns (if SFM or TFM)

**RC, SF, TF, RC/SF, RC/TF, SF/TF:**

|  |   |
|--|---|
|  | m |
|--|---|

Maximum bay length between columns

**OU P7. LBM: WALL OPENINGS, RC: PIER TYPE**

G7. LBM, LBM/RC, LBM/SF, LBM/TF:  
Minimum 2 photos for the typical panel (with large openings), 1 external and 1 internal; RC, SF, TF, RC/SF, RC/TF, SF/TF: Minimum 2 photos for beam column connection

**LBM, LBM/RC, LBM/SF, LBM/TF:**

|  |   |
|--|---|
|  | m |
|  | m |
|  | m |
|  | m |

Typical size of window opening width  
Typical size of window opening height  
Typical size of door opening width  
Typical size of door opening height

**RC, SF, TF, RC/SF, RC/TF, SF/TF:**

|  |   |
|--|---|
|  | m |
|  | m |
|  | m |
|  | m |
|  | m |
|  | m |
|  | m |
|  | m |

Typical size of window opening width  
Typical size of window opening height  
Typical size of door opening width  
Typical size of door opening height  
Typical column width  
Typical column depth  
Typical beam width  
Typical beam depth

**OU P8. FOUNDATION TYPE**

Previous work is needed to inform this parameter  
(collect technical drawings or MoE/local expert experiences on typical construction practice and soil type)

G8. Minimum 2 photos

**Foundation structure**

|  |   |
|--|---|
|  | Reinforced concrete isolated spread footing |
|  | Reinforced concrete combined footing        |
|  | Reinforced concrete strip footing           |
|  | Reinforced concrete mat footing             |
|  | Stonework strip footing                     |
|  | Brickwork strip footing                     |
|  | Other (specify): _____                      |
|  | Don't know                                  |

**Soil Type**

|  |                        |
|--|------------------------|
|  | Hard rock              |
|  | Medium soil            |
|  | Soft clay              |
|  | Other (specify): _____ |

**OU P9. SEISMIC POUNDING RISK**

G9. Minimum 1 photo showing the two adjacent buildings and the space between them (if yes)

|                          |     |
|--------------------------|-----|
| <input type="checkbox"/> | Yes |
| <input type="checkbox"/> | No  |

If yes:

|                      |   |
|----------------------|---|
| <input type="text"/> | m |
| <input type="text"/> | m |

Minimum building separation  
Height of the shorter building

**OU P10. SEISMIC RETROFITTING**

Previous work is needed to inform this parameter (collect technical drawings or MoE/local experts experience) .

G10. Minimum 2 photos for retrofitting details (if retrofitted)

|                          |     |
|--------------------------|-----|
| <input type="checkbox"/> | Yes |
| <input type="checkbox"/> | No  |

If no:

|                      |                                       |
|----------------------|---------------------------------------|
| <input type="text"/> | Year of retrofitting (if retrofitted) |
|----------------------|---------------------------------------|

What was the retrofitting intervention? \_\_\_\_\_

Who has retrofitted the school? \_\_\_\_\_

**P11. STRUCTURAL HEALTH CONDITION**

Check the type of critical condition observed:

G11. Minimum 2 photos for each critical condition observed: 1 to identify the type + 1 to identify the extent

|                          |  |
|--------------------------|--|
| <input type="checkbox"/> | Structural cracking (walls and/or columns or beams)  |
| <input type="checkbox"/> | Corner separation  |
| <input type="checkbox"/> | Foundation settlement  |
| <input type="checkbox"/> | Corrosion of steel rebar/members   |
| <input type="checkbox"/> | Poor quality of materials in lateral load resisting elements (wall or frame elements)            |
| <input type="checkbox"/> | Poor quality of construction process in lateral load resisting elements (wall or frame elements) |
| <input type="checkbox"/> | Poor quality of construction process in floor or roof elements                                   |
| <input type="checkbox"/> | Poor quality of materials in floor or roof elements  |
| <input type="checkbox"/> | Structural deflection  |
| <input type="checkbox"/> | Masonry efflorescence  |
| <input type="checkbox"/> | Covering or plaster cracking/detachment  |
| <input type="checkbox"/> | Other (specify): _____   |
| <input type="checkbox"/> | None   |

**P12. VULNERABLE NON-STRUCTURAL COMPONENTS**

G12. Minimum 2 photos for each vulnerable non-structural component

**Parapets**

|                          |                |
|--------------------------|----------------|
| <input type="checkbox"/> | Fair           |
| <input type="checkbox"/> | Good           |
| <input type="checkbox"/> | Poor           |
| <input type="checkbox"/> | Nor applicable |

G12. Minimum 1 photo for each element with the worst condition

**Gables**

|  |                |
|--|----------------|
|  | Fair           |
|  | Good           |
|  | Poor           |
|  | Nor applicable |

**Overhangs**

|  |                |
|--|----------------|
|  | Fair           |
|  | Good           |
|  | Poor           |
|  | Nor applicable |

**Roof coverings**

|  |                |
|--|----------------|
|  | Fair           |
|  | Good           |
|  | Poor           |
|  | Nor applicable |

**Ceilings**

|  |                |
|--|----------------|
|  | Fair           |
|  | Good           |
|  | Poor           |
|  | Nor applicable |

**Bookshelves**

|  |                |
|--|----------------|
|  | Fair           |
|  | Good           |
|  | Poor           |
|  | Nor applicable |

**Partitions**

|  |                |
|--|----------------|
|  | Fair           |
|  | Good           |
|  | Poor           |
|  | Nor applicable |

**HVAC components**

|  |                |
|--|----------------|
|  | Fair           |
|  | Good           |
|  | Poor           |
|  | Nor applicable |

**Others (specify):** \_\_\_\_\_

|  |                |
|--|----------------|
|  | Fair           |
|  | Good           |
|  | Poor           |
|  | Nor applicable |

**SKETCH OF THE BUILDING**

Make hand sketches of the followings in the specified area, in red specify the retrofitting if it exists.

(Record key plan dimensions, including length, width, distance between columns/bays/transversal load bearing walls)

G13. Take photos of respective sketches

Horizontal plan  
Vertical elevation long direction  
Vertical elevation short direction

**COMMENTS**

Specify any additional observations of the building structure which can affect structural performance

G14. Minimum 2 photos for each special observation

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