

Seismic risk assessment of schools in Nepal for effective disaster risk reduction practices

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Supplementary File

This file contains Earthquake Evacuation Drills procedure guide.

Earthquake Evacuation Procedure Guide

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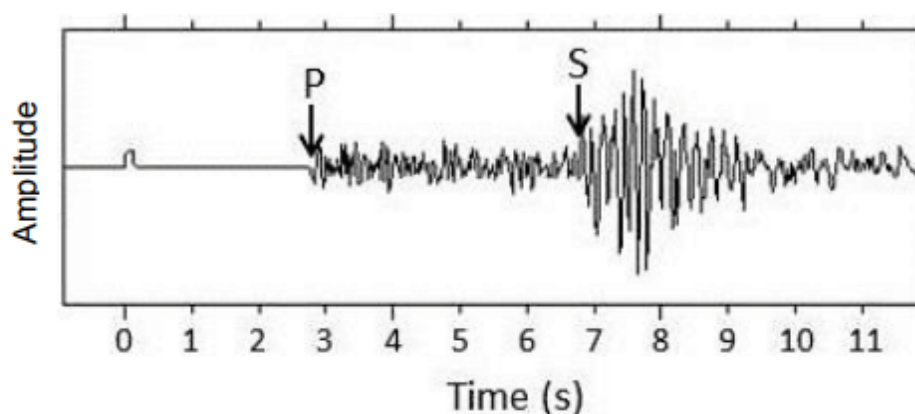


Figure 5. Illustration of a typical seismogram from a small earthquake, showing the time separation between the initial P wave and the later, larger S wave. In this example, the S-minus-P time is approximately 4 seconds.

‘The most recent disaster fades from memory just before the next one strikes.’ – Japanese proverb¹

‘However, these technical advances are necessary but not sufficient to advance earthquake and tsunami preparedness. Public education is essential. And often the most basic lessons are the most empowering.’¹

‘The findings reinforce the importance of having individuals decide before an earthquake how they should respond in locations where they spend the most time.’²

‘Why is a “Drop, Cover, and Hold On” drill important? To respond quickly you must practice often. You may only have seconds to protect yourself in an earthquake before strong shaking knocks you down, or something falls on you.’³

What Can You Do to Prepare for an earthquake?

By preparing, planning and practicing your response to an earthquake (or any disaster/fire) you are putting yourself in a better position to be able to save lives and resume normal life afterwards.

This is an earthquake evacuation procedure (EEP) guide, it is not definite. It will need adapting for your school, e.g. whether you have a 1 floored building or 2 or whether your children are primary or secondary age. **This is a starting point.**

It's important all staff are involved with your practise. Students are made aware & engaged. So:

1. Include preparation discussions for your school's procedure in your staff meetings. Take this document to your meeting.
2. Formulate your school emergency plan, see below. Ensure all staff know their roles.
3. Do an earthquake risk assessment for each room to assess what you would do during an earthquake. Practise your evacuation and then review risk assessment.
4. Create an EEP when you get back to school. Try it out. Then review it.
5. It's important to start, remember there is no good time for an EEP, but there is a need to practise and that practise will really help save lives and limit injuries.
6. Use your classroom lessons to discuss your preparations for your EEP.

The 7-step procedure below will help you:

Step 1:

Secure your space by identifying hazards and securing moveable items, e.g., ensure furniture is attached to walls and heavy objects are kept on low shelves.



Photo Credit: California Earthquake Authority

Step 2:

Plan to be safe by creating a school emergency plan and deciding how you will communicate.

- Have a discussion ask ‘How would you react when the ground begins shaking?’
- Ask students to prepare a poster for an evacuation procedure.
- Where is a **safe place** to hide? e.g., under desk, by an internal wall, face away from wall/window.
- Prepare your route of evacuation.
- Where are your ‘**safe zones**’?
- Practise your evacuation procedure.
- After a disaster, who would you contact/where would you meet?
- What actions would you take to ensure the immediate safety of your class/school?



Photo Credit: California Earthquake Authority



Photo Credit: Sarah Houghton



Photo Credit: Shiba Subedi

Step 3:

Organize emergency supplies in convenient locations.

Arrange an earthquake emergency safety pack (EESP) for every classroom & emergency safety box(es) for school to be stored outside. Check every term.

EESP contents:

- whistle
- torch
- first aid kit
- bottled water
- emergency blankets
- unperishable food
- shoes
- dust masks
- register

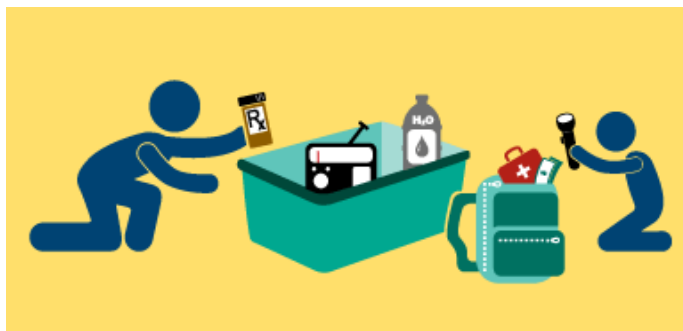


Photo Credit: California Earthquake Authority



चित्र ८: आवश्यक सामानको लागि कटपद कोला तथा कोला नित्रका सामग्रीहरू

Photo Credit: NSET

Step 4:

Prepare and organise important documents and strengthen school building. Ensure there is adequate outdoor evacuation space. Check evacuation routes.



Photo Credit: California Earthquake Authority



Figure 3. Fallen bricks near building from front wall collapse (left) and partial wall collapses (right), 2015 Gorkha Nepal earthquake (Credits: Anne Sanquini, (left), Bipin Shrestha (right), provided by Earthquake Engineering Research Institute)



Figure 1a (left). Collapsed private school in central Port-au-Prince metropolitan region; a neighboring single-family house sustained no damage; (b, right) Well-built commercial building (left side) adjacent to catastrophic collapse of neighboring structure.

Photo Credit :Sarah Houghton

When the earth shakes, what do you do?

Step 5:

Where are you? -

Outside:

1. If you are outside: Stay outside! Do **NOT** enter a building.
2. Go to a 'safe' zone; i.e. away from trees/buildings/bridges/electric lines, poles, transformer.
3. Drop to the ground.
4. Make as small as possible ball with your body.
5. Cover your head and neck.

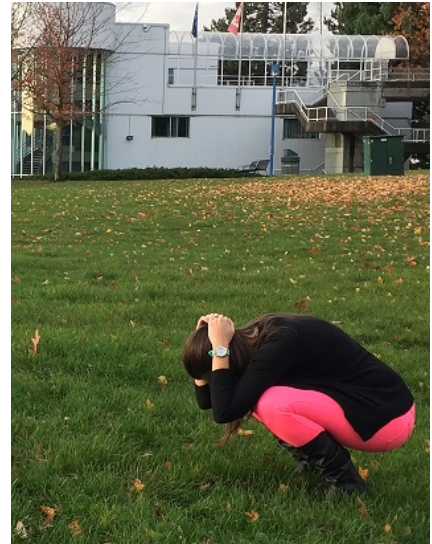


Photo credit: Capilano University

Inside, Ground floor:

1. Procedure for classrooms on the ground floor needs careful consideration, risk assessment and planning.
2. First assess your building, is it earthquake safe?
3. Then assess the location of your classroom; is there a 'danger zone' outside your classroom door? i.e., an area 1-5 metres around a building where masonry can fall?
4. Is there direct access to a 'safe zone' outside? Can you make it outside easily, i.e., are you on the ground floor with direct access to the outdoors?
5. Then assess if you can evacuate your whole class in about 5-15 seconds (this is the "window of opportunity," the time between the first perceptible shaking and the stronger shaking that makes walking difficult). You may need to try it, yourself as a teacher first with colleagues.



Photo Credit: Niranian Shrestha

As a school then assess the risk of evacuating directly outside or staying inside (Drop/Cover/Hold On). If your school building is not earthquake proof go outside as soon as possible.

Inside, 2nd and higher floor:

1. Drop. Cover. Hold on.
2. Face away from windows if possible.
3. Keep covering your head/neck with your hands or a book.

What the teacher does:

1. Evacuates (if on ground floor & assessment to evacuate has been made).

OR

Instructs children/students to:

- Drop/cover & hold on.
 - Point face away from windows.
 - Stay calm and quiet.
2. Opens classroom door to avoid it getting stuck.
 3. Grabs EESP.



Photo Credit: <https://www.youtube.com/watch?v=-P0pSPm6dX4>



Prepárate

Elabora tu Plan Familiar de Emergencia.
Ten lista tu Mochila para Emergencia.



Ubícate

En una zona segura: columnas o estructuras de concreto armado durante el sismo.



Evacúa

Hacia una zona segura externa: parques, plazas y otra área libre determinada por la municipalidad.



Figure 2. Two different messages regarding what action to take inside a building: going to a pre-identified “safe zone” (left) and Drop, Cover, and Hold On (right). Images courtesy: Instituto Nacional de Defensa Civil (INDECI), Peru and ShakeOut.org, USA.

Once shaking has stopped, what to do?

1. Keep calm.
2. Check register – is everyone accounted for?
3. Any injuries/anyone trapped? Get student to check themselves and their neighbours for any injury.
4. If all are accounted for and you can move outside easily do. Go to a 'safe zone'. Follow evacuation procedure below.
5. Try to minimize the use of mobile phone, to keep the lines free for those in urgent need and rescue teams.

Advice for night time:

1. Stay in bed.
2. Roll over to protect stomach area.
3. Cover head with pillow to help avoid falling objects.
4. Once shaking has stopped, keep calm, check your body for injury.
5. Grab your EESP (attached to your bed, put shoes on).
6. Evacuate to a 'safe zone'.

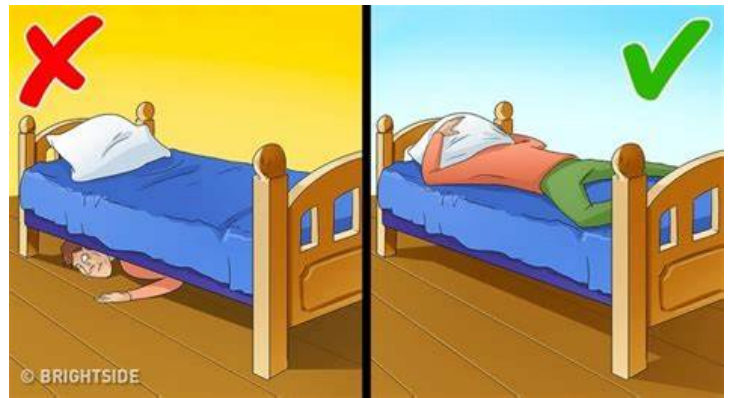


Photo Credit: Bright Side

<https://www.youtube.com/watch?v=hWSu4l1RxLg&t=294s>

How to improve your safety after an earthquake?

Step 6:

Improve your safety after earthquakes by evacuating, helping the injured, and preventing further injuries or damage. Remember there may be aftershocks and buildings may be unstable.

Evacuation

Evacuation will depend on where your classroom is and where you are with your class at that moment in time, as well as if your building has been affected.



Photo Credit: Sarah Houghton

1. If you are outside, stay outside, find a clear space. ‘Drop, Cover, Hold On’.
2. If you remained inside then you will need to evacuate to your ‘safe zone’.
3. A ‘safe zone’ is a space away from buildings/trees/posts. Most likely this is where the school assembly is in the mornings.
4. Be prepared for aftershocks, you may need to ‘drop, cover and hold on!’ If there is no solution get out of the building.
5. Take the register. Is everyone present? If not report those missing to ‘Incident leader’.
6. Report those injured to First Aid team.



चित्र २५: सुरक्षित स्थानमा भेला हुँदै विद्यार्थीहरू

Photo Credit : NSET

7. Stay with your class unless you have set up a procedure to help others by joining classes together. If you merge classes some teachers are free for Disaster Response Roles, e.g., First Aid, Evacuation Team.
8. The children are best to stay at school with their teachers until somebody from their home comes to get them. It may be dangerous for them to try to go home by themselves, or something may have happened to their house or apartment building in the earthquake, and their family may be staying elsewhere. Children can practice waiting at school as part of their earthquake evacuation exercises.

If you are trapped

1. Protect first your body and head and check yourself for injuries.
2. Protect your mouth, nose, and eyes from dust.
3. If you are bleeding, put pressure on the wound and elevate the injured part.
4. Signal for help by shouting, or with your emergency whistle or by knocking loudly on solid pieces of the building, three times every few minutes. If you have a mobile phone then try and make contact with school to help (have school phone number in your phone) or use emergency contact number 112.
5. Rescue personnel will be listening for such sounds.

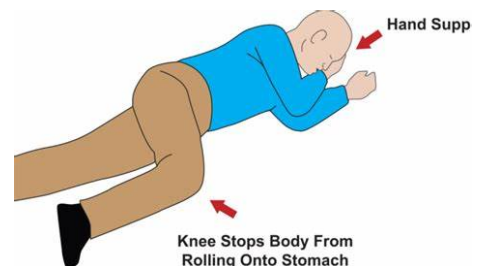
Help the injured

Check to see if anyone is injured. If you are a **first aider/medical person/doctor**, put your skills to use by assisting those in need.

1. If a person has no pulse, begin CPR (cardiopulmonary resuscitation). First check airway, tilt head back, 30 heart compressions, 2 breaths, repeat.
2. If a person is not breathing, administer rescue breathing.
3. If a person is unconscious but breathing put them in the recovery position.
4. If a person is bleeding, put direct pressure on the wound. Use clean gauze or cloth, if available.
5. Treat anyone injured or traumatized for **shock** by keeping them warm with a blanket. Elevate their feet over their heart, *as long as* this does not interfere with their injuries.
6. Do not move seriously injured persons unless they are in immediate danger of further injury.
7. Cover injured persons with blankets or additional clothing to keep them warm.
8. Get medical help for serious injuries. Call emergency service (Note there may be power outage & services may be occupied).
9. Carefully check children or others needing special assistance.



Photo credit: iStock.com/DarrenTownsend



Recovery position

Shock - position



Photo Credit :Sarah Houghton

Prevent further injuries or damage

Be prepared for aftershocks and stay away from anything that looks like it may fall.

1. *Fallen Items.* Beware of items tumbling off shelves when you open the doors of closets and cupboards.
2. *Fire.* If you are trained and have a fire extinguisher handy, put out small fires. Large fires are a sign to evacuate. Call emergency service.
3. *Gas Leaks.* Shut off the gas stove regulator only if you suspect a leak.
4. *Damaged Electrical Wiring.* Shut off power at the main switch if there is any damage to wiring. Leave the power off until the damage is repaired.
5. *Broken Lights and Appliances.* Unplug these as they could start fires when electricity is restored.
6. *Downed Power Lines/electric poles.* If you see downed power lines or poles, consider them energised and stay well away from them.
7. *Spills.* Clean up any spills carefully and with caution.
8. *Damaged Masonry.* Stay away from chimneys and walls made of brick or block. They may be weakened and could topple during aftershocks.

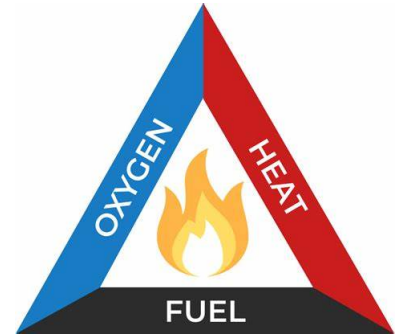


Photo Credit:

<https://www.ascofire.co.uk/latest->

Let people know you are OK & stay informed

1. Update your local government school liaison, tell them your status, then stay off the phone.
2. Phone service may be out or overloaded. Try **texting** main contacts of children/staff. Then avoid calls to make sure the network is free to handle emergency calls.
3. Listen to local radio.
4. Use smartphone to access rescue information or weather forecasts in your areas, if you have access to recharging facilities. If not save your battery.



Photo Credit: Sarah Houghton

After the earthquake

Step 7:

After the immediate threat of an earthquake has passed, your level of preparedness will determine what happens in the following weeks and months. For the children, some level of ‘normalness’ will be needed, so try to resume school if possible but allow for trauma and time to talk about the earthquake as well as recovery from physical injuries.

There will be a need to restore daily life by reuniting with others, repairing damage, and rebuilding community.

1. Following aftershocks, continue to check for gas leaks, chemical spills, damaged electrical wiring and broken water pipes.
2. Your school may be asked to be a hub for those who have lost their homes. Be prepared to help neighbours, especially the elderly or those who struggle.
3. Monitor local radio or television reports about where to get emergency help.
4. Use fresh food first if safe. Save canned goods for later.
5. If your water is off or unsafe, you may need to purify water or access bottled water.
6. Do not eat or drink anything from open containers that are near shattered glass.
7. Wash hands



चित्र २२: दिवा विशाख त्रिस्तकेपछि साबुन पानीले हात धुदै

Photo Credit: NSET

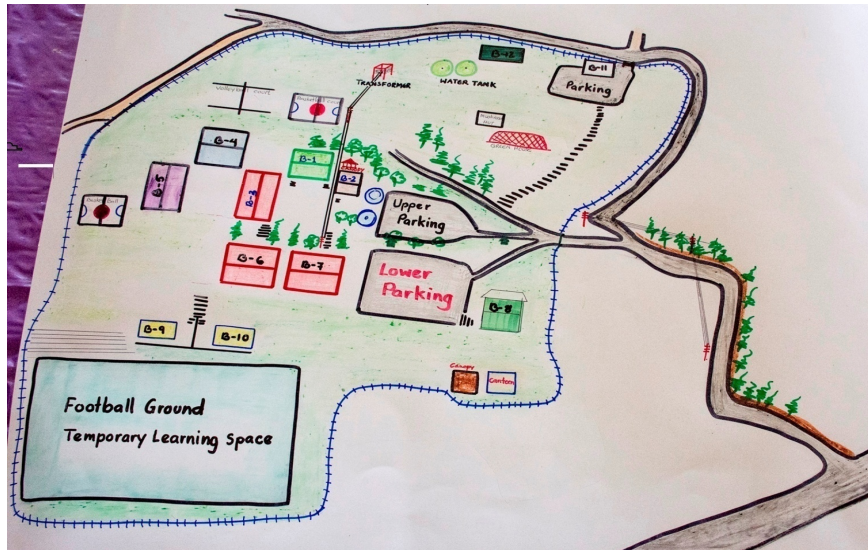
Your school's emergency management plan

Preparing for a Safe and Happy Learning Environment

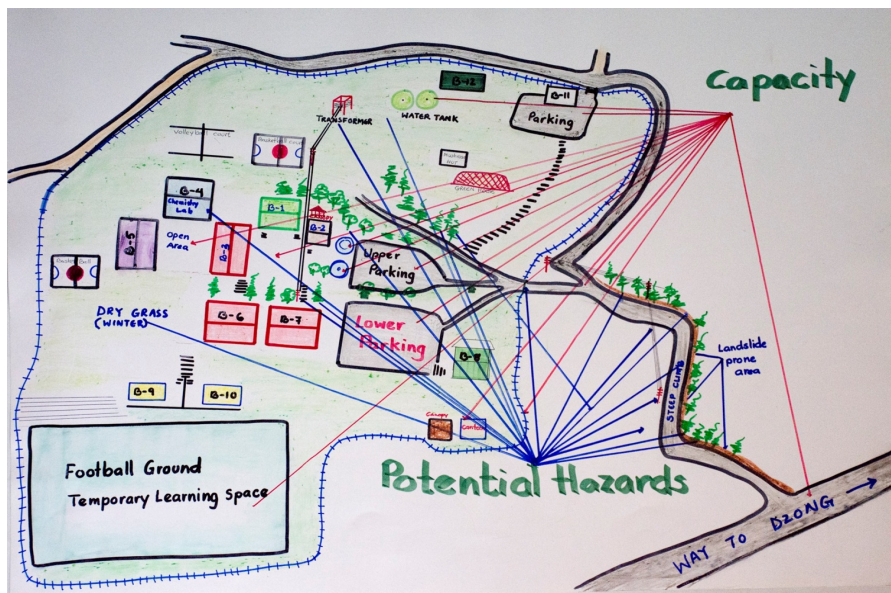
A school emergency management plan aims to ensure the safety of the students and the staff during an emergency such as a fire/earthquake. The following are the objectives:

- give all teachers/staff this guide;
- identify your school's 'emergency' team, e.g. first aiders, evacuation team, planning team (those who will create your emergency management plan). Note: emergency incident leader may not be your head teacher;
- identify 'safe zones' and evacuation routes for each classroom and share these with students, e.g., create a map, label routes. Note: students may change classrooms each year so they will have to learn afresh plans for new rooms;
- identify hazards in the school and create awareness of these hazards, e.g., structural problems, power lines;
- find ways to manage and mitigate these hazards, e.g., can walls be strengthened;
- plan preventive measures for identified hazards, e.g., put hazards on map;

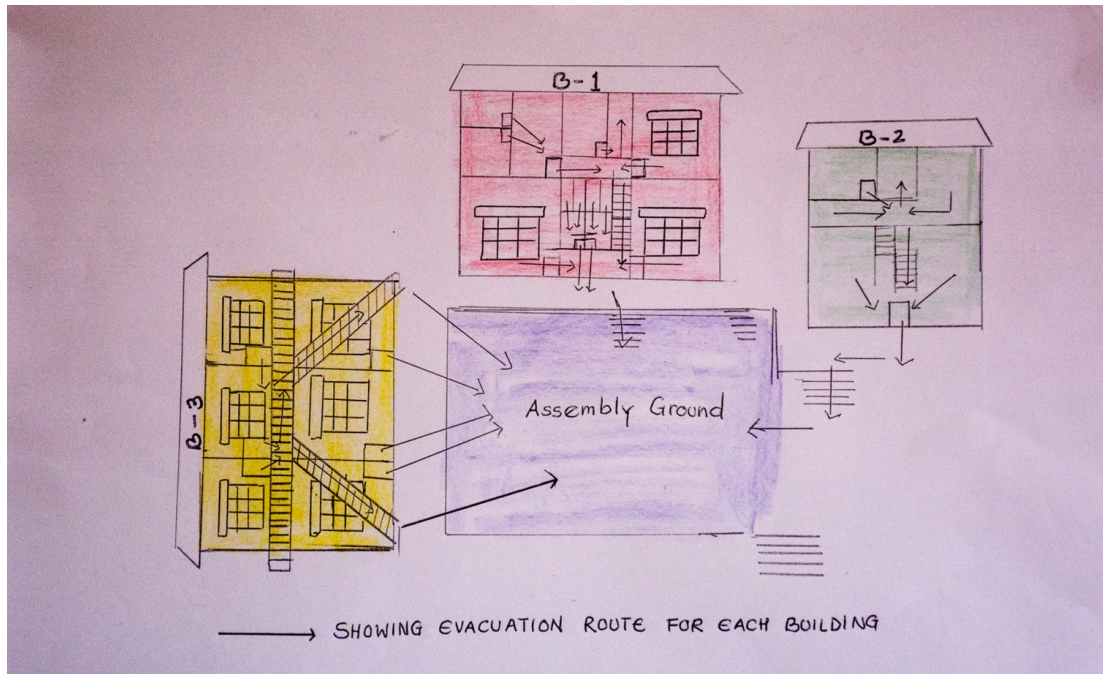
- implement risk reduction activities, e.g. secure bookcase, keep evacuation routes clear;
- establish affective disaster preparedness and emergency response;
- identify training and capacity building needs for effective prevention, mitigation and response for disaster, e.g., send teachers to subsequent conferences, give fellow teachers this guide;
- arrange dates for practise evacuations;
- do a 'surprise' practise, ensure staff/students know there will be one but they won't know when.



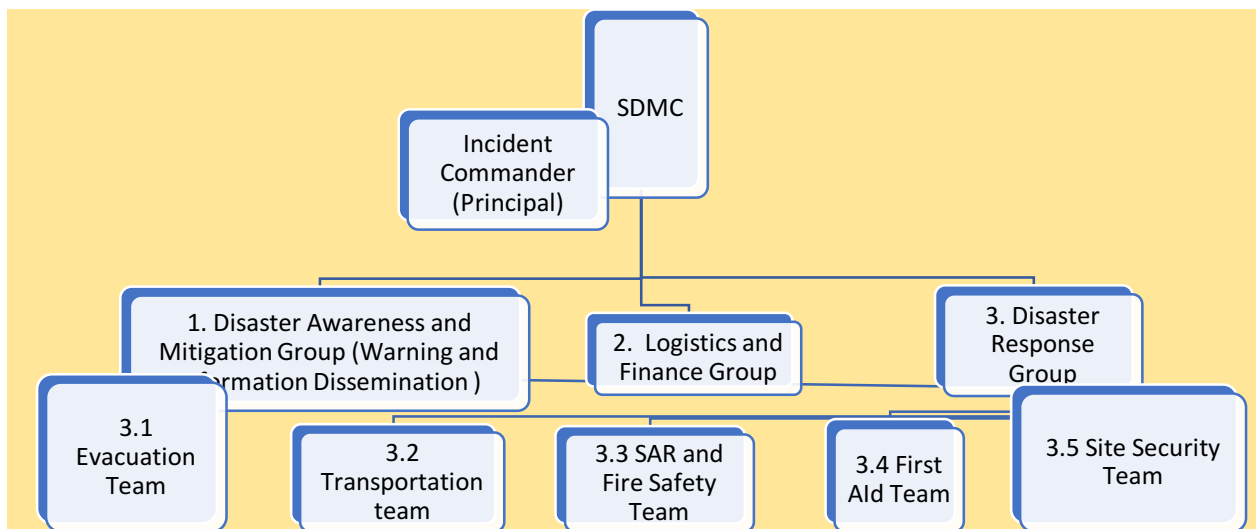
Map of school (Photo Credit: Sarah Houghton)



Map of school including potential hazards, e.g., landslide prone areas and capacity, e.g., open spaces
(Photo Credit: Sarah Houghton)



Map of evacuation routes (Photo Credit: Sarah Houghton)



A typical plan of team structure (SDMC: School Disaster Management Committee)

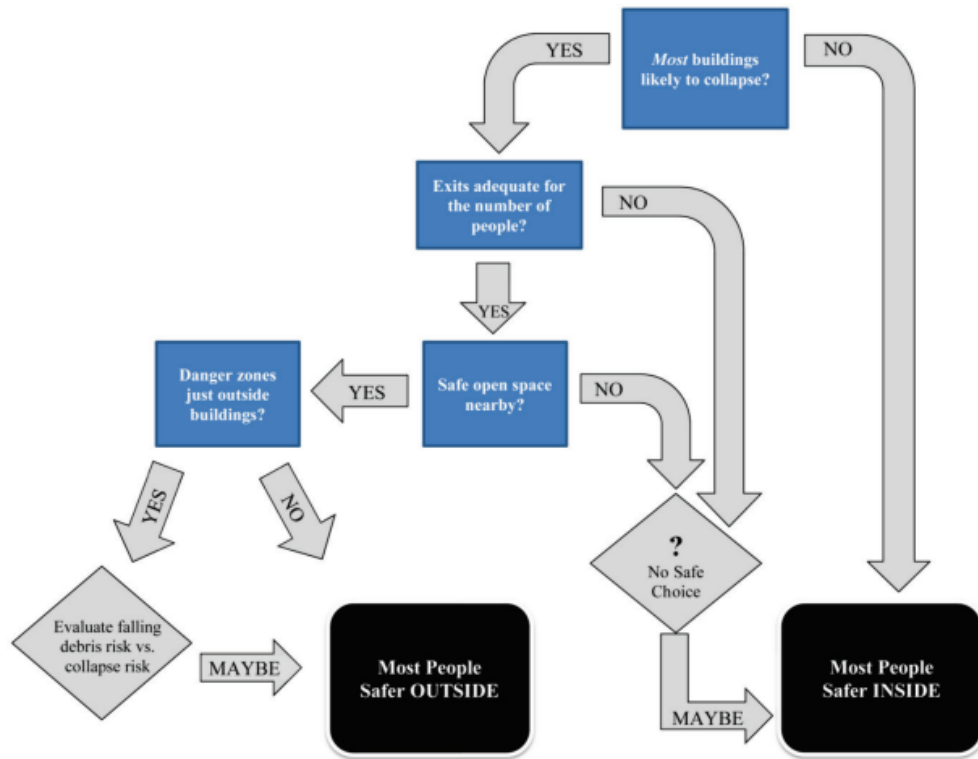


Figure 7. Flowchart to determine whether most people are likely to be safer inside or outside.

EXAMPLE Earthquake Risk Assessment for _____ school / site**Date:** _____**Place/Room:** _____

Risks are assessed according to **a)** how serious they would be if they happened and, **b)** how likely they are to happen. Then a written description is given of the circumstances and reason for each risk and what precautions (if any) have been taken to bring it to an acceptable level. The risk levels given are with all reasonable precautions in place.

A risk would be unacceptable if the risk was considered high after all reasonable precautions were in place. Use Figure 7 on the previous page to assess your risk. Here below are some examples:

What are the hazards?	Who might be harmed and how?	Severity (High, Medium, Low)	Possibility (Very Likely, Likely, Unlikely)	What is already being done?	What further action is necessary?	Action by whom?	Action by when?	Done
My building is unsafe	Pupil or teacher from collapsing building	H	L	Evacuate	Continue assessing			
Second floor classroom	Pupil or teacher may not evacuate in under 5-10s	H	VL	Drop, Cover, Hold On	Practise completed			
Danger zone outside classroom	Pupil or teacher by falling debris	M	U		Check danger zone	Pupil or teacher	In 5 days	

Should the plan go ahead?

Review after evacuation trial (Was the assessment appropriate? Were there any unexpected hazards? Significant findings during assessment):

Risk assessment completed by:

Earthquake Risk Assessment for _____ school / site

Date: _____

Place/Room: _____

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Should the plan go ahead?

Review after evacuation trial (Was the assessment appropriate? Were there any unexpected hazards? Significant findings during assessment):

-
-
-

Risk assessment completed by:

Education engagement timetable

Activity	Annual activities – earthquake education	Timing	Cooperation with other agencies
Evacuation practise	1. 25th April – 1st evacuation practise of the year (remembering the 2015 earthquake) 2. Autumn - 10:19 am on 19th October – https://www.shakeout.org/ 3. Jan 15th/16th (remembering the 1934 earthquake – National earthquake safety day in Nepal) 4. Any date – a ‘surprise’ evacuation practise – incident leader to decide date/time and instigate event.	Allow ~ 60 minutes	e.g., invite fire department
Assembly	Theme related to ‘earthquakes’ and ‘how to keep safe’. If this is held near the beginning of the academic year, then the process related to evacuation practise and the introduction of a potential ‘surprise’ evacuation can be introduced so as not to scare students.	~ 30 minutes	e.g., invite an earthquake expert to your school
Lesson/s	e.g., watch films, earthquake awareness song , pack EESPs – use the ‘Beat the quake’ earthquake card game to help you, discuss/draw ‘evacuation’ posters.	varied	e.g., invite an earthquake expert to your school

Checklist for a Practice Earthquake Evacuation Procedure

Before 'practise' evacuation:

1. Give teachers/staff this guide.
2. Complete school emergency management plan, risk assessments and announce team.
3. Speak with students and help them plan the evacuation, e.g. posters, signage, preparing earthquake emergency safety pack (EESP), ask them to count to 5 seconds.
4. Ask teachers/staff to do a trial evacuation without the students.

During 'practise' evacuation:

1. Order evacuation (ring the school bell?).
2. Depending on location some will need to 'drop, cover and hold on' and then evacuate while others will evacuate immediately.
3. Assist in evacuation to 'safe zone', help students with special needs.
4. Check the register, ensure all the students and staff have been safely evacuated. Report to incident leader.
5. Check who is in need of medical aid.
6. Communicate first aid and rescue needs to medical and rescue team.
7. Check students are ok and not traumatised by evacuation.
8. Check timing on how long it took for all to assemble in 'safe zone'.

Conclusion of Evacuation:

1. Incident leader to announce school re-entry/breaktime.
2. Coordinate the return of students and teachers to the school building/classes.
3. Encourage all participants to report potential improvements to evacuation procedure.
4. Record improvements in 'Earthquake evacuation procedure report form'.
5. Revise evacuation procedure accordingly and circulate to all staff.
6. Debrief staff and students.

Earthquake evacuation procedure report

Name of the School:

Tel No:

Email:

Address:

Contact Person:

Number of students who participated:

Number of teachers:

Any physically impaired students?

When was evacuation procedure conducted?

How long did evacuation take?

Was the register taken after evacuation to safe zone? (y/n):

What any other activities were carried out during the procedure? (Search & Rescue, First Aid etc):

During debriefing what improvements were noted?

Any other remarks

Reporting Instructions

- Email a copy of report to your school director and to Seismology at School in Nepal
- For any questions contact the local government officer and Seismology at School in Nepal program
- Send additional evidence, e.g., photographs with report

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