Reducing Earthquake Risk in Hospitals
from Equipment, Contents, Architectural Elements
and Building Utility Systems

A Training Course for Nurses
Student Guide

Reducing Earthquake Risk
from Equipment, Contents, Architectural Elements and Building Utility Systems

A Training Course for Nurses

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Purpose
Hospitals provide life-saving medical care on a daily basis to the communities that they serve. Communities expect the hospital staff to save lives in an emergency and to care for community members that have been severely injured or have become seriously ill. Earthquakes threaten your hospital’s ability to carry out its responsibilities to care for the ill and injured. Past earthquakes around the world have destroyed hospitals or damaged them so that they could not function. These hospitals failed their communities in their hour of greatest need.

Reasonable measures can reduce the risk of earthquake damage and losses, and to keep hospitals functioning after an earthquake. This half-day training course will help you reduce one of the major sources of earthquake-related damage and losses: a hospital’s medical equipment and supplies, contents, architectural elements, and building utility systems. Damage to these items has caused deaths, injuries, building functional loss, and economic loss in past earthquakes, even in cases in which the building structure itself was essentially undamaged. The course also provides a brief introduction to the other components necessary for keeping a hospital functional and safe: structural safety of hospital buildings, hospital emergency preparedness, and personal preparedness for the staff.


Learning Objectives
Our objective is that you should be able to do the following after completing the course:

1. Understand why earthquake safety is important:

   (a) Understand why hospitals need to function and continue to care for patients after an earthquake, and not just avoid collapse of the hospital’s buildings;
   (b) Understand what might happen to the hospital and its equipment, systems, architectural elements and contents if a strong earthquake occurred; and
   (c) Understand the basics of earthquake hazard in the region (i.e., that earthquakes can affect their location, historical earthquakes that occurred in the area, etc.).

2. Understand how to reduce the damage and consequences caused by an earthquake:

   (a) Know the basic elements of a hospital earthquake risk management program: risk assessment, building safety, securing objects and systems, preparedness planning and training/ practice;
(b) Recognize and understand how to anchor or relocate items than can fall, slide, or topple and break, interrupt life support, cause injury or block exits;
(c) Recognize the need to work with facilities personnel to develop earthquake safety solutions that do not compromise functionality;
(d) Know the basics of the hospital emergency planning process; and
(e) Know what to do before, during, and after an earthquake.

3. Understand how you can participate in earthquake safety efforts:

(a) Know the options for your involvement: join safety committee, identify and anchor hazards, develop solutions, etc.
(b) Think about your potential role in the hospital’s emergency preparedness plan; and
(c) Develop a family preparedness plan.
Presentation Notes

Reducing Earthquake Risk
from Equipment, Contents, Architectural Elements & Building Utility Systems
A Training Course for Nurses

INTRODUCTION

Bhuj Civil Hospital
Hospitals are Particularly at Risk

Preventing Collapse is Critical

Building collapses usually kill the most people
Most causes of collapse are well known to engineers

Preventing Collapse Is Not Enough

Photo credit: Kanchan Sabnis, GeoHazards Society
Photo credit: Manisha Dharan, THOT Designs

Photo credit: Mehmet Celebi, U.S. Geological Survey

Photo credit: K. Steinbrugge, Natl. Inform. Service for Earthquake Engineering (NiSEE), Univ. of California, Berkeley

1971 M6.6 San Fernando, California, USA Earthquake
Photo credit: Earthquake Engineering Research Institute (EERI)

1994 M6.7 Northridge, California, USA Earthquake
Photo credit: Penco Engineering, Inc.
You Can Help Reduce Risk

Research on Causes of Injuries

Ingredients for a Functional Hospital
Topics
- Earthquake basics
- Earthquake damage and consequences
- Identifying and mitigating risk
- Hospital emergency preparedness basics
- Personal and family preparedness

Today’s Schedule
9:00-9:20 Introduction and Earthquake basics
9:30-9:50 Earthquake damage and consequences
9:50-11:00 Identifying and mitigating risk
11:00-11:30 Tea Break
11:30-12:00 Implementing risk reduction measures
12:00-12:40 Hospital emergency preparedness basics
12:40-13:00 Personal and family preparedness

Questions?
Earthquakes Have Affected Delhi

Earthquakes that caused damage in the Delhi region:
- 1505 Lo Mustang (Nepal border) earthquake
- 1720 Gharwal Himalayas earthquake
- 1803 Mathura earthquake

Many other earthquakes felt in Delhi that luckily caused little or no damage.

What Causes Earthquakes Affecting Delhi
Earthquakes Happen on Faults

Future Earthquakes Will Affect Delhi

How strong will the shaking feel?
• This is called intensity
• Reported on a scale of I to XII
• Based on
  – Human perception of shaking
  – Damage to buildings
  – Effects on nature

Estimated intensity for 2005 Kashmir Eq.
Aftershocks Happen – Be Prepared

2001 Gujarat Earthquake

Questions?

EARTHQUAKE DAMAGE AND ITS CONSEQUENCES
Would you go in this hospital?

What about this one?
Damage to Everything Else

Could you work in this building?

What Happens Inside During Shaking
What causes damage?

**Shaking**
- Causes things to:
  - Topple or overturn
  - Slide

**Bending and Stretching**
- Affects things that span:
  - Floor to floor
  - Between buildings

Topple or Slide?

<table>
<thead>
<tr>
<th>Top-Heavy</th>
<th>Tall, Slim &amp; Uniform</th>
<th>Bottom-Heavy</th>
<th>Short, Stout &amp; Uniform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topple</td>
<td>Topple</td>
<td>Slide</td>
<td>Slide</td>
</tr>
</tbody>
</table>

Consequences of Earthquake Damage

- Loss of life
- Loss of function
- Loss of property/money
- Loss of community confidence
Loss of Life

Photo credit: Degenkolb Engineers, FEMA

1987 M5.9 Whittier Narrows, California, USA Earthquake

Loss of Function

Photo credit: William T. Holmes, Rutherford & Chekene

2006 M6.7 Hawaii, USA Earthquake

Loss of property or money

Photo credit: FEMA

1971 M6.6 San Fernando, California, USA Earthquake
Loss of Community Confidence

Photo credit: Earthquake Engineering Research Institute

1994 M6.7 Northridge, California, USA

Demand & Capacity After an Earthquake

Source: PAHO

Questions?
IDENTIFYING AND MITIGATING RISK FROM OBJECTS AND SYSTEMS

What can be a hazard?

In each department of the hospital, ask yourself:
- What can happen here?
- Will it hurt someone?
- Interrupt life support?
- Harm patients’ health?

Can we exit safely after an earthquake?
Options for Reducing Risk

- Relocate
- Protect:
  - Anchor, brace or restrain against shaking
  - or -
  - Accommodate movement
- Plan for cleanup or breakage
Relocate

Objects that can:
• Block exits
• Fall on someone

Anchor, Brace or Restrain

Objects that can:
• Fall on someone
• Topple and break
• Block exits (if not able to relocate)

Accommodate Movement

Anywhere there is differential motion:
• Pipes, ducts, conduits between buildings or across joints
• Attachments to equipment and tanks
• Partitions
Plan for Cleanup or Breakage
Relocation or restraint may not be practical or possible for items such as:

- Medical records
- Some mobile equipment
- Some items on trolleys
- Pharmacy

Functionality Requirements

Communication Points
Which item is most important?

- Backup Generator
- X-Ray Unit
- AC Unit

Prioritising Based on Consequences

- **Critical Safety**
  - Securing these items
  - Prevents loss of life

- **Essential Services**
  - Securing these items
  - Prevents loss of essential functions

- **Continued Operation**
  - Securing these items
  - Prevents loss of function and loss of property

Objects Belong to Systems

- Emergency Generator
- Diesel Tank and Fuel Lines
- Batteries
- Electrical Cabinet
- Conduit for Wires
- Life Support Systems
- Bottles

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When to Get Help

• When you aren’t comfortable doing it yourself
• You will need an engineer for:
  – Objects > 100 kg (too heavy for two people to lift)
  – Sensitive medical equipment; hazardous materials
• You will need a tradesperson for:
  – Any work involving building utility systems

Questions?
Specific Categories of Objects

- Medical equipment
- Furnishings and hospital admin systems
- Supplies
- Mechanical and electrical equipment
  - Pipes, ducts and conduits
  - Tanks and medical gases
- Architectural elements
- Lifts

Medical Equipment

- Large floor-mounted equipment: Imaging/scanning, blood bank refrigerators
- Autoclaves and sterilizers
- Operation theatre lights
- Wheeled or trolley-mounted: radiant warmers, anaesthesia machines, ventilators
- Small wall-mounted equipment: monitors
- Laboratory bench-mounted equipment
Methods of Anchoring

Autoclaves and Sterilizers

Earthquake Damage
Methods of Anchoring

OT Lights

Damage in an Earthquake Simulation
Earthquake Performance

Methods of Anchoring

Monitors and Wall-mounted Equip.
Laboratory Bench-mounted Equip.

Earthquake Damage

Methods of Anchoring
Questions?

Furnishings and Administrative Systems

• Cupboards
• File cabinets
• Medical records
• Computers

Cupboards

Photo credit: Janise Rodgers, GHI

Photo credit: SEEDS
Questions?

Supplies
- On trolleys
- On racks
- Pharmacy
- Sterile storage

On Trolleys

Photo credit: Manisha Dharan, THOT Designs
Questions?

Mechanical and Electrical Equipment

• Emergency power: generators, batteries
• Electrical: transformers, cabinets, switchgear
• Fire-fighting: fire water pumps, extinguishers
• Communications: cabinets, rooftop equipment
• Cooling: chillers, cooling towers, rooftop units, window ACs and coolers
• Heating/hot water: Boilers, geysers

Air Coolers in Windows

Photo credit: L. Thomas Tobin, GHI

Photo credit: Janise Rodgers, GHI
Earthquake Damage

Methods of Anchoring

Questions?
Architectural Elements

- Parapets, sunshades, balcony walls
- Masonry partition walls
- Suspended ceilings
- Pendant light fixtures and ceiling fans
- Windows and glass
- Other items: jalousies, decorative ceramic tile veneer, entrance canopies

Pendant Light Fixtures and Fans

Earthquake Damage

Photo credit: Hari Kumar, GHI

Photo credit: William T. Holmes, Rutherford & Chekene

2010 M8.8 Maule, Chile Earthquake

1971 M6.6 San Fernando, California Earthquake
Earthquake Damage

Methods of Anchoring

- Film is available in different thicknesses
- Can also be used for security purposes

Exterior Falling Hazards
HAZARD HUNT EXERCISE

Hazard Hunt Tips

• “Earthquake eyes”
• Questions to ask:
  – What can happen here?
  – Will it hurt someone?
  – Interrupt life support?
  – Harm patients’ health?
• Use the checklist and make detailed notes
IMPLEMENTING RISK REDUCTION MEASURES

Is it too heavy?

If two people can’t lift it, you probably need an engineer to help anchor it.

Estimating Weight

- > 150 kg
- 100 kg
- 50 kg
- > 25 kg

- Computers under 25 kg.
- Small monitors under 25 kg.
- Cupboards 20-100 kg.
- Blood bank refrigerators 100-150 kg.
- Midsize laboratory refrigerators 90-120 kg.
- Imaging equipment
- Laboratory equipment 10-40 kg
- Major mechanical equipment
- Large furniture 100-200 kg.
Is the brick wall strong enough?

• Two bricks wide (220 mm) and some rows of bricks turned sideways: objects 230kg or less

• If wall is one brick wide (110 mm) OR two bricks wide and no sideways bricks: anchor to a floor-to-ceiling support called a strongback instead

Anchoring to Masonry Walls

• In concrete frames you must first verify that wall fits tightly against the beam at the top

• Install the right type of anchor according to manufacturer instructions

• Insert anchors into bricks, not mortar joints

• Check mortar condition with coin or small tool such as pen knife

• Consult an engineer for objects too heavy for two people to lift when working together

Anchoring to Concrete

• Install the right type of anchor according to manufacturer instructions

• Avoid rebar when drilling holes for anchors

• If you accidentally hit rebar, STOP drilling and relocate the hole – DO NOT cut thru rebar

• Clean the dust out of the hole
Safety

• Don’t “do it yourself”:
  – Electrical power systems
  – Inflammables and gases
  – Hazardous chemicals
  – Heights

• Follow safety practices:
  – Use eye protection and tie back long hair when using drill machines or other power tools
  – Move heavy items properly to avoid back injuries

Planning & Coordination

Ask whether you need to:
• Take equipment out of service?
• Switch off utilities (electrical power, water)?
• Avoid times when the equipment sees heavy use?

Coordinate with hospital administration and facilities to plan for and minimize disruption

Prioritising Risk Reduction Measures

Simple Method

<table>
<thead>
<tr>
<th>Critical Safety</th>
<th>Essential Services</th>
<th>Continued Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Priority</td>
<td>Medium Priority</td>
<td>Low Priority</td>
</tr>
</tbody>
</table>

More Realistic Method

<table>
<thead>
<tr>
<th>Critical Safety</th>
<th>Essential Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Cost</td>
<td>Low Disruption</td>
</tr>
<tr>
<td>High Priority</td>
<td>Medium Priority</td>
</tr>
</tbody>
</table>

Critical Safety

Moderate Cost
Low Cost
Low Disruption

Essential Services

Moderate Disruption
Low Cost
Low Disruption
Estimating Costs

Questions?

EXERCISE: SMALL GROUP DISCUSSIONS ON POTENTIAL SOLUTIONS FOR HAZARDS
Before an Earthquake

- Form a hospital safety committee
- Understand the hazards you face
- Assess your risk and impacts on operation
- Train your staff and drill regularly
- Make the following plans:
  - Mitigation plan
  - Emergency response plan
  - Continuity of operations plan
  - Continuity of business plan
- Identify alternative sites/facilities to operate from

Hospital Safety Committee

Representatives from all departments, including:

- Administration
- Nurses and doctors
- Medical departments: ED, Radiology, etc.
- Facilities/engineering
- Security
- Laboratory
- Housekeeping
Determine Hazards and Threats

- Hazards:
  - Earthquakes: shaking & secondary hazards like fire
  - Floods
  - Fire
  - Cyclones
- Threats:
  - Epidemics
  - Terrorist acts
- Multi-hazard assessment tools available

Determine Vulnerability

- Buildings
- Equipment, contents, architectural elements and building utility systems
- Access to and egress from buildings and site
- Transportation systems and utilities serving hospital

Elements of a Hospital Emergency Plan

- Damage assessment
- Discharge procedures
- Command system & roles
- Staff preparedness & training
- Surge capacity
- Staff call backs
- Supply management
- Backup communications
- Evacuation criteria & procedures
- Protocols for patients/ staff injuries
Surge Capacity

- Damaging earthquakes often:
  - Create mass casualties
  - Damage or affect the hospital directly
- How will you handle the influx of patients?
- Where and how will you triage patients?
- Treat them?
- What will you do with the “walking wounded” and the “worried well”?

Number and Severity of Casualties

<table>
<thead>
<tr>
<th>Number and Severity of Casualties</th>
<th>Days after earthquake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal admission levels</td>
<td>0</td>
</tr>
<tr>
<td>Immediate surge due to building damage and injuries</td>
<td>1</td>
</tr>
<tr>
<td>Continued influx of large numbers of severely injured patients and building issues</td>
<td>2</td>
</tr>
<tr>
<td>Long term medical care and reestablishment of normal functioning</td>
<td>7</td>
</tr>
</tbody>
</table>

Process for Developing a Plan

Form committee → Assign Tasks → Test → Revise → Develop
Tasks and Plan Development

- Gather information:
  - How are things done normally?
  - What would change after a disaster?
  - How can we do things better?
- Identify needs and gaps
- Each portion of the plan will have specific tasks
- Someone will need to write each draft section

Testing the Plan

- Tabletop exercises
  - Simple
  - Enhanced
- Mock drills
- Large-scale exercises

Incident Command System

Standardized, all-hazards system for event or emergency management

Organization in a hospital could look like:

- Expands or contracts based on incident size
Incident Response System
ICS adapted to Indian administrative context
Coming soon ....
Organization looks like:

IRS/ICS is designed to
• Meet the needs of events of any kind or size
• Allow personnel from a variety of organizations and agencies to meld rapidly into a common management structure
• Provide logistical and administrative support to operational staff
• Be cost effective by avoiding duplication of efforts
• Be flexible – no need to match the organizational structure for day-to-day operations

Command and Control
• Unity of command
  – Clear
  – Creates accountability
• Transfer of command
• Span of control
  – Leader directly manages small number of resources
  – Optimal number in ICS is five; maximum is seven
  – ICS organizational structure expands and contracts as needed to maintain manageable span of control
Security and Crowd Control

People will converge on the hospital. Security will:
• Control access
• Provide perimeter security
• Manage vehicle traffic at emergency entrance
• Facilitate entry of patients and triage
• Designate areas outside the hospital but within secured perimeter for family members and the media

Communication and Liaison

• Communication of accurate and useful information is critical
• ICS/IRS specifically provides command staff
  – Information and Media Officer
  – Liaison Officer
• Communication with family members needs special consideration

Scenario

Photo: Credit: Janise Rodgers, GHI
Prepare People and Provisions

- Train the staff and repeat training on a schedule
- Conduct regular drills
- Implement preparedness measures called for in the plan
- Keep enough supplies on hand for 72 hours, including for your mass casualty plan

Mitigate Risk

- Seismic retrofit of building or replacement with earthquake resistant new construction
- Anchor, brace and protect
- Backup systems
- Insurance

During an Earthquake

Drop, Cover and Hold On
After an Earthquake

Put your plan into action!

- Help rescue/treat injured staff and patients
- Take protective measures
- Shut off leaking oxygen or gas if any nearby
- Be prepared for aftershocks
- Evacuate only if building in danger of collapse or if patients can’t be treated inside

Protective Measures

- Don’t put yourself in dangerous situations
- Don’t use lifts
- No open flames
- Wear protective clothing: sturdy shoes, plus masks, gloves, and medical gowns

Questions?
If an earthquake happened now...

- How would you contact your family?
- Can they manage while you are working at the hospital?

If you were at home:
- What would you eat?
- Drink?
- How would you get to the hospital?
Create a Family Emergency Plan

- Hold a family meeting
- Designate an out of area contact
- Pick locations for family to reunite
- Identify safest places and exits in house and each room
- Make sure everyone knows how to protect themselves

Protect Your Family Physically

- Check that your home or building was built to code with earthquake resistant features
- Identify and anchor falling hazards
- Secure gas cylinder
- Have a fire extinguisher and know how to use it
- Get one family member trained in First Aid

Home Hazard Hunt

- All family members should participate
- Check places where your family spends most time: where people sleep, eat, work and play
- Make a list of what needs to be done and tackle it one by one until it’s finished
- Do the Hazard Hunt from the level of the shortest member of the family!
Prepare Emergency Supplies

- You should plan to be on your own, without external aid, for 3 days at least
- What will you and your family need for those 3 plus days?

Sample Family Emergency kit

- Non-perishable food to last 72 hours
- Water (10 liters per day per person)
- First aid kit + prescription medicine + sanitary items
- Torch + spare batteries
- Radio + batteries
- Emergency cash
- List of emergency telephones
- Copies of valuable documents (scan & email)
- Spare eye glasses etc.
- Whistle

Get Trained

- Coordinate with your hospital’s disaster preparedness committee
- Utilize local resources for training
Today We Learned

- Why hospitals are at risk from earthquakes
- About earthquake basics
- About earthquake damage and consequences
- How to identify and mitigate risks
- About hospital emergency preparedness basics
- How to prepare ourselves and our families for an earthquake or other disaster
Next Steps

- Summary of next steps for project; will vary with situation

What YOU can do

- Think about your role
- Create a family emergency plan
- Drill and practice

Questions?
Help us improve

• Please fill out the questionnaire
• Let us know how we can improve:
  – the training
  – the manual
• Email any additional feedback to info@geohaz.org

Thank You

This training course was made possible by generous support from:

Swiss Re
Appendix – Resource Materials
# Hospital Building Systems and Contents
## Hazard Assessment Checklist

<table>
<thead>
<tr>
<th>Section/ Block:</th>
<th>Date of Assessment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Number/Use:</td>
<td>Assessment Conducted By:</td>
</tr>
</tbody>
</table>

## Potential Hazards

<table>
<thead>
<tr>
<th>Medical Equipment</th>
<th>Check if item present</th>
<th>Total no. of units</th>
<th>Does item need to be: Moved Anchored</th>
<th>Priority Level</th>
<th>Engineering required?</th>
<th>Supplies and tools needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoclave</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>2</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Anesthesia machine</td>
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<td>□</td>
<td>□ □</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitor</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>1 or 3</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Operation theatre light</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>2</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Ventilator</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imaging equip. (X-ray, CT, etc.)</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>2</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Radiant warmer</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheeled or trolley mounted equip.</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small wall-mounted equip.</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laboratory bench-mounted equip.</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood bank refrigerator</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td>□</td>
<td>□</td>
<td>□ □</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Furnishings and Hospital Administrative Systems

<table>
<thead>
<tr>
<th>Cupboards</th>
<th>□</th>
<th>□</th>
<th>□</th>
<th>1 or 3</th>
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<tbody>
<tr>
<td>File cabinets</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>3</td>
</tr>
<tr>
<td>Medical records storage</td>
<td>□</td>
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<td>□</td>
<td>3</td>
</tr>
<tr>
<td>Computer Equipment</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>3</td>
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<tr>
<td>Other:</td>
<td>□</td>
<td>□</td>
<td>□</td>
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## Supplies

<table>
<thead>
<tr>
<th>On racks</th>
<th>□</th>
<th>□</th>
<th>□</th>
<th>3</th>
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<tbody>
<tr>
<td>On trolleys</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>3</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>3</td>
</tr>
<tr>
<td>Sterile storage</td>
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<td>□</td>
<td>□</td>
<td>3</td>
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<td>Other:</td>
<td>□</td>
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## Mechanical and Electrical Equipment

<table>
<thead>
<tr>
<th>Emergency generator</th>
<th>□</th>
<th>□</th>
<th>□</th>
<th>1</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteries for emergency power</td>
<td>□</td>
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## Potential Hazards

<table>
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<tr>
<th>Potential Hazards</th>
<th>Check if item present</th>
<th>Total no. of units</th>
<th>Does item need to be:</th>
<th>Priority</th>
<th>Engineering required?</th>
<th>Supplies and tools needed</th>
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<td><strong>Pipes, Ducts and Conduits</strong></td>
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<td>Lift control panel/cabinet</td>
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</table>

Priority levels: 1 = Critical Safety, 2 = Essential Services, 3 = Continuous Service

**Notes:**
# Cost Estimation Worksheet

<table>
<thead>
<tr>
<th>Item to Be Anchored</th>
<th>Location of Item</th>
<th>Hardware Type</th>
<th>Unit Price (Rs.)</th>
<th>Quantity</th>
<th>Material Cost (Rs.)</th>
<th>Labor Cost (Rs.)</th>
<th>Total Cost (Rs.)</th>
<th>Priority (High/Medium/Low)</th>
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</tbody>
</table>

Total costs

$0 \quad 0 \quad 0$
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