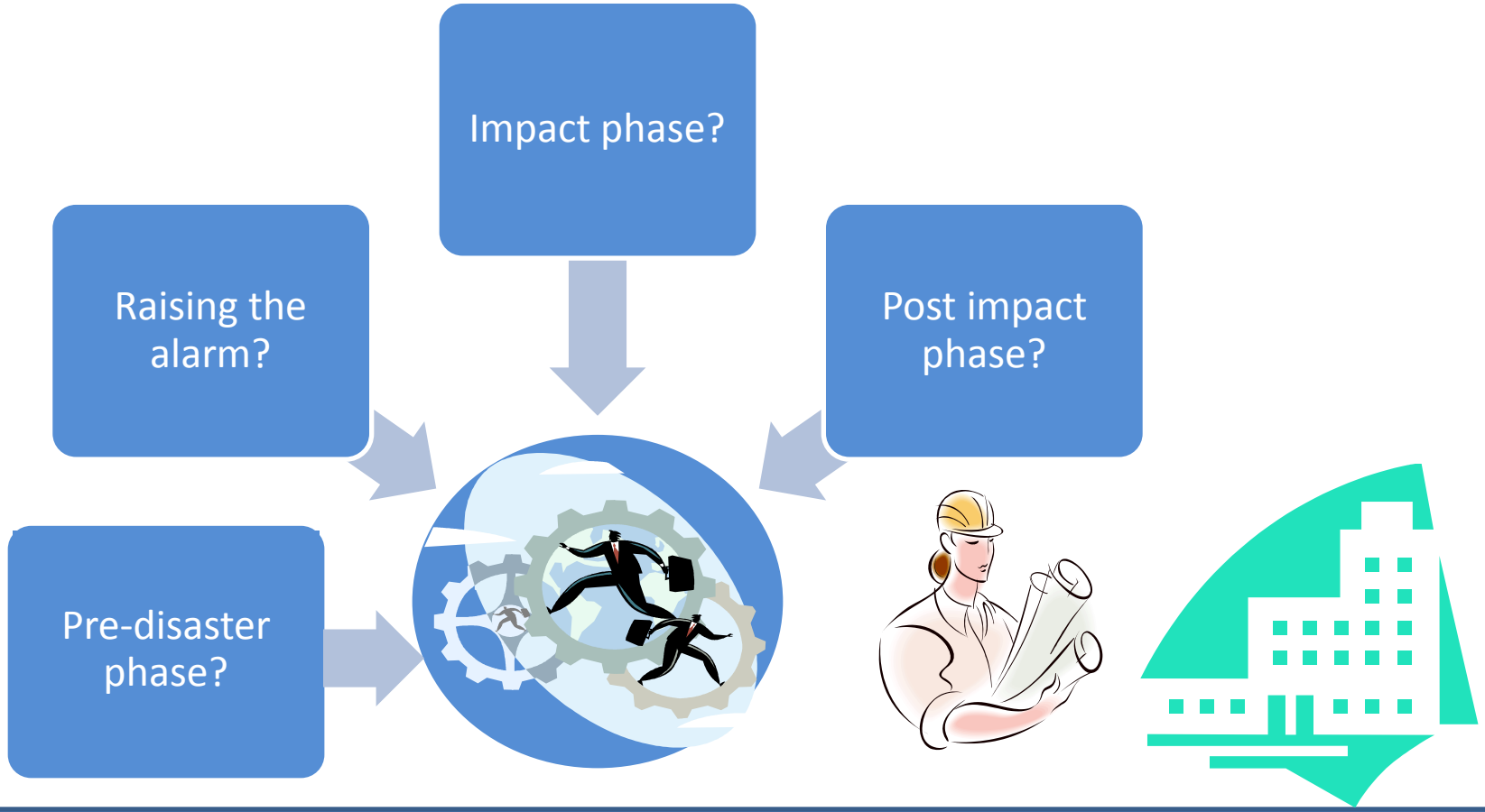
Towards Disaster Management Readiness



Key considerations

A **Risk Mitigation plan** should outline those activities that help an organization check or control the damage that can be caused during a disaster i.e.

1. It should involve **structural mitigation** to assess and ensure the buildings, installations and other construction activity conform to norms. Please refer to details on structural mitigation in the next section of this toolkit.

2. It should also involve **non-structural mitigation** like

a. Legal framework planning and establishment
b. Land-use or space-use planning
c. Financial framework and incentives planning
d. Training and education
e. Awareness raising/sensitization

These details on non-structural mitigation are included in the separate toolkit edition for building management or facility management companies.

Checklists for structural mitigation

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Key considerations

When it comes to **structural mitigation** for hazard resistant construction, there are different norms and guidelines that need to be followed for each type of disaster

(A) For Earthquakes

We can make buildings, offices or living spaces earthquake resistant. The key considerations are as follows:

1. The design of a facility or building constructed on a seismic zone will vary from that of a building constructed in a region of higher seismic resistance. The design will take into consideration any ground shaking that will be major, medium or minor, and will reduce the risk of serious damage, collapsing structures and falling debris.
2. The building should be so constructed that it adheres to Building codes for structural and non-structural design measures
3. The structures should have high vibration energy absorption, seismic resistant steel should be used

Key considerations

What happens during an earthquake?

1. First is **the vertical or horizontal acceleration of the ground**, which moves suddenly sideways or upwards. If frame of building does not have enough sway strength it may fall down.

Norm/Guideline: Design sway resistance in steel used in buildings

2. Second is the **vibration from shock waves**, which causes oscillations. The oscillations can build up and produce greater sway loads until the building collapses or overturns.

Norm/Guideline: Improve ductility of steel frames of buildings

3. Third is the **after shock**, where buildings rely on internal walls or sheer bracing for sway resistance

Norms/Guidelines:

(a) Follow norms or guidelines for Building configuration

(b) Follow norms or guidelines for Foundation

Key considerations

(c) Follow norms or guidelines for control on openings in walls

(d) Follow norms or guidelines for control on wall length and building height

(e) Follow norms or guidelines for water-proofing of building

(f) Follow norms or guidelines for providing vertical reinforcement

(B) For Cyclones

To achieve hazard resistant construction for cyclones, we need to keep in mind the following points and needs:

1. The building must be protected from high-velocity winds
2. The whole structure should be designed in such a way that it can withstand lateral movement and uplift forces
3. Certain parts of the building such as the frames and gables should be braced
4. The connection between the roofs and the walls should be strengthened
5. Other protection measures could include

(a) Follow norms or guidelines in selection of site

(b) Follow norms or guidelines in planning orientation of building

Key considerations

(c) Follow norms or guidelines in deciding upon parameters for building foundation

(d) Follow norms or guidelines in deciding upon openings in the building

(e) Follow norms or guidelines in deciding upon paneling in the building

(f) Follow norms or guidelines in deciding upon roof and rooftop structures for the building

(g) Other norms or guidelines are installing of wind-break fences and planting of shelter belts in the direction of the wind, if building is in the country-side, or out in the open

(C) For Floods

There are various mitigation measures to control damage to buildings due to floods, some of them are

(1) Selecting site such that it is away from flood plains or away from large water bodies that can flood

(2) If it is not possible to select a site away from flood plains or large water bodies, then it is important to follow certain mitigation measures like

Key considerations

(a) Follow norms or guidelines to elevate the building so as to keep the lowest floor above flood level

(b) Making the building water tight to restrict entry of water (blocking of doors, windows and air vents with boards, use of coal fly-ash in construction of embankments or dykes)

(c) Making the exposed parts of the building resistant to water damage (use of coal fly-ash as it has self-cementing properties)

(d) Designing sloping rooftops, basements, driveways and suitable storm water drains to help prevent water logging in manageable circumstances

(D) For Landslides and Mudslides

There are certain mitigation measures that can control damage to buildings due to landslides or mudslides, they are as follows:

(1) Selecting proper sites for construction

(2) Avoiding cutting down of trees to make way for construction sites

(3) Planting trees on open or unconsolidated slopes of hilly areas

(4) Constructing channels or drainage systems on slopes

Key considerations

(5) Constructing retention structures
(6) Constructing deflection structures or protection walls
(7) Constructing wide ditches around building

(E) If building or facility on a hill, one needs to watch out for the following warning signs:

(1) Sudden jamming of doors and/or windows
(2) Cracks appear on plaster
(3) Cracks on the ground or paved areas begins to widen slowly
(4) Water distribution lines, under-ground utility lines break
(5) Walls either tilt or move
(6) Outside walls or stairs pull away from the main building
(7) Fences or poles tilt or move
(8) Ground at base of slope swells up
(9) Water appears at the base of the slope