

UNIT 8

Man-Made Disasters - Public Awareness For Disaster Risk Reduction



Learning Objectives

- Understand the community based Disaster Risk Reduction approaches.
- List out the important man-made disasters.
- Describe the rules of action during stampede.
- State how to protect one -self from drowning.
- Explain the measures of how to prevent fire accident
- Elucidate the rules of action for transport accident.



Unit Overview

- 8.1 Introduction
- 8.2 Community based Disaster Risk Reduction
- 8.3 Man - made disasters
 - 8.3.1 Stampede
 - 8.3.2 Drowning
 - 8.3.3 Fire Accident
 - 8.3.4 Industrial Disasters
 - 8.3.5 Road Accident

8.1. Introduction

"Mumbai railway station stampede kills at least 22"

"Rush-hour crush on footbridge connecting two stations was triggered by falling concrete that caused panic!"

At least 22 people have been killed and more than 30 injured during a rush-hour stampede on a bridge between two railway stations in Mumbai. The crush occurred on a narrow footbridge connecting Prabhadevi station, formerly Elphinstone, and Parel station during the Friday, September 29, 2017 morning commuter rush and amid heavy rain. "There was a huge crowd on the foot over bridge. Everybody tried to leave at once and it appeared one of them slipped and fell, triggering the stampede," said an Indian Railways spokesman. Another spokesman said the number of people on the bridge was higher than usual because people were using the station to shelter from the rain.

The above incident throws some lights on how to be aware of the accidents we encounter in our daily walk of life. Let us try to answer the following questions:

1. Which is more important life or the scheduled journey to be completed?
2. Why rushing in anything may be disastrous?
3. Why timely communication is more important to avoid accident?

The root of the word disaster ("bad star" in Greek and Latin) comes from an astrological theme in which ancients used to refer to the destruction of a star as a disaster.



Terms to know:

1. Hazard is a potentially damaging physical event or human activity which may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.
2. Disaster is a serious disruption of a society functioning, causing widespread human, material losses which exceed the ability of the affected society to cope using its own resources.
3. Disaster risk management is a set of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of disaster.
4. Capacity - the assets, resources and skills available within a community that can be used to reduce the risks or effects of a disaster.
5. Disaster risk reduction includes activities that will minimize disaster-related losses of life and property.

Disaster is a serious disruption, causing damage or injury to people, buildings, roads, livelihoods, or the environment, which exceed the community's ability to cope.

The magnitude and impact of disasters are increasing and disasters have disrupted social, economic and environmental community activities worldwide. International data shows that disasters have taken, over the last 10 years, more than 478,000 lives. It has affected 2.5 billion people and caused direct economic losses in the amount of 690 billion US dollars worldwide.

Recent financial studies underline the urgent need for a shift from sole disaster response to disaster risk reduction. Therefore, efforts should be made to ensure that disaster risk reduction is an important aspect of poverty

reduction and general development initiatives in the coming years.

8.2 Community-Based Disaster Risk Reduction

Community is a group of people living in the same place having homogenous characteristics. It includes shared experiences, locality, culture, language and social interests. Community-based disaster risk reduction is a process within a community and for the community. Reducing risk in communities should address the root causes of risks and address it through local knowledge and expertise. Performance and the arts provide a variety of creative opportunities to communicate. Important messages through live experiences. Examples include: Street theatre, dramatic readings, skits and plays, puppet shows, poetry reading.

Dance, flash mob activities in large urban settings (a group of people who assemble suddenly in a public place, perform an unusual act and then disperse), tapping into oral traditions such as story-telling, music and sing-along, mural-making and other hands-on art and design activities. All of these can involve volunteers and community members, as performers and audiences. Skilled performers find creative ways to engage their audience.

8.3 Man - made Disasters

Disasters induced by human beings are man-made disasters. It includes fire accident, transport accident, structure failure, mining accidents, explosions, stampede etc. In this lesson, we study about some of the man-made disasters.

8.3.1 Stampede

The term stampede is a sudden rush of a crowd of people, usually resulting in injuries and death from suffocation and trampling. In stampede, the term mob or crowd is used to refer to a congregated, active, polarized aggregate

of people, which is basically heterogeneous and complex. Its most salient features include homogeneity of thought and action among its participants and their impulsive and irrational actions.

Causes of stampede

Incidents of stampedes can occur in numerous socio-cultural situations. These stampede incidents can be categorized into the following types: Entertainment events, escalator and moving walkways, food distribution, processions, natural disasters, power failure, religious events, fire incidents during religious/ other events, riots, sports events and weather related events.



Large religious gatherings are the major stampede events in developing countries like India. As stated in a newspaper in 2013, 79 percent of stampedes in India have taken place at religious events.

Stampede Management

Crowd management is defined as the systematic planning and supervision of the orderly movement and assembly of people. Crowd control is the restriction or limitation of group behavior.



The rules of action for stampede

1. Notice Alternate Exit: First thing to know in such situations is the route out. If you are attending an event, one of the things you

can do in preparation is to try and know the topography of the place. This will help you find the exits. So, when struck in a stampede, try to identify these exits.



2. Keep Your Hands by Your Chest: Your hands must be up by your chest like they would be in a boxing position. This makes it easy to move. It also stops your ribs from getting crushed by the crowd on both sides. When the crowd pushes you from front and back, your lungs will be affected. You will suffer of suffocation.



3. How to move when on your feet: In the middle of a moving crowd, do not resist the flow by standing still or sitting down. The force is too much to fight. Like in a wave, there is force and in crowd situation. Keep moving diagonally between the pockets of people whenever there is a lull. Try to move towards the exits but not towards walls or fences where you might be cornered. Keep moving with the crowd to avoid falling.



4. How to move if you fall: If you fall and get back on your feet, cover your head with your hands and hurl up in a fetal position. Basically, avoid exposing your lungs to the crowd. Keep trying to find an opportunity to get up.



5. Communicate smartly: When trapped in the crowd, use sign language such as waving your hands up one side after another so that you will not get exhausted.

6. Conserve energy: Keep calm and do not try to scream. That only increases panic.

7. Set a meeting place: Arrange a meeting place, in case you get separated, one inside and another one outside.

If someone extends his/her hand for help, grab hold to keep them up.

Child safety Tips: Take a second, take a photo.

Before taking children out to any event, pull out your phone and take a photo of each child individually a selfie. That way you have a picture of how they looked that day. The photo can be sent to police to aid in locating the child in case the child is lost in a crowd.

8.3.2 Drowning

Drowning is the 3rd leading cause of unintentional injury death worldwide, accounting for 7% of all injury-related deaths. There are an estimated 3,72,000 annual drowning deaths worldwide. Children, males and individuals with increased access to water are most at risk of drowning. Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid; outcomes are classified as death, morbidity and no morbidity.

Fact File

It is one of our most visceral fears; thrashing in the deep, far below the water's surface, lungs burning for oxygen. Drowning claims hundreds of thousands of lives every year, a great many of whom are young children. Of course, exposure to water is a key factor in drowning, but there is a strong economic correlation as well. Those in poorer countries are far more likely to be drowning. In Bangladesh, 17,000 children drown annually that's 46 a day.

Fresh Water and Salt Water Drown You Differently.



Fact File continue



At first glance, it would appear that swimming in the ocean is far more dangerous than swimming in a lake. Crashing waves and riptides can easily sweep beachgoers to their doom. But shockingly enough, about 90 percent of drowning cases occur in freshwater. The reason involves a bit of chemistry. Fresh water is more similar in composition to our own blood than salt water. When it is inhaled into the lungs, it passes into the bloodstream through osmosis. When the blood is so radically diluted, cells burst, leading to organ failure. The entire process takes two to three minutes.

Ocean water contains far more salt than human blood. When it is aspirated, the body attempts to regulate itself by transferring water into the lungs, thickening the blood. It takes considerably longer to kill a person, between 8 to 10 minutes, allowing a much greater chance of rescue.

Males are especially at risk of drowning, with twice the overall mortality rate of females. Studies suggest that the higher drowning rates among males are due to increased exposure to water and riskier behavior such as swimming alone, drinking alcohol before swimming alone and boating. Drowning accounts for 75% of deaths in flood disasters.

Prevention

There are many actions to prevent drowning. Installing barriers (e.g. covering wells, using doorway barriers and playpens, fencing swimming pools etc.) to control access to water hazards.

Community-based, supervised child care for pre-school children can reduce drowning risk. Teaching school-age children basic swimming, water safety and safe rescue skills is another approach.

Setting and enforcing safe boating, shipping and ferry regulations is an important part of improving safety on the water and preventing drowning. Building resilience to flooding and managing flood risks through better disaster preparedness planning, land use planning, and early warning systems can prevent drowning during flood disasters.

8.3.3 Fire Accident

Massive forest fires may start in hot and droughty weather as a result of lightning, and human carelessness or from other causal factors. Fires can lead to the destruction of buildings, wooden bridges and poles, power, transmission and telecommunication lines, warehouses of containing oil products and other fuel. It causes injury to people and animals.

Students' activity

Mock Drill: To escape a fire, **stop, drop, and roll**. In case your clothes burn, stop running, drop on the floor and roll to stop fire spreading.

During droughts or windy weather, fire may destroy low vegetation and trees. The spreading speed of low fire is 1-3 m/sec and high fire may reach up to 100m/sec.



Think why?

Smoke kills more than fire.

Rule of actions for Fire Accident-Do's

1. When Fire accident occurs, warning should be given by shouting or ringing bell.
2. Extinguish the fire using sand and other fire extinguishers.
3. Main switch should be switched off immediately.
4. If clothes started burning, the victim should roll on the ground to extinguish the fire.
5. The combustible materials found near the fire accident place, have to be discarded so that the fire does not spread to them.
6. If fire breaks out with smoke spreading, cover the nose, crawl and move out.
7. Think that life is more valuable than belongings.
8. Move from the fire accident place to a safe place.



Preventive Measures

1. Create a safe zone between the house and flammable plants.
2. Cut off all the branches of trees with below three meter height standing near your house.
3. Remove moss and dry branches from plants standing near the house.
5. Clean ditches and pits from dry branches and leaves.
6. Keep flammable materials in the checked safe containers.
7. Ask your relative or friend living in a different location to be your contact person.
8. Have a fire extinguisher and know how to use it.



A natural gas vent in Iraq known as The Eternal Fire of Baba Gurgur, meaning 'Father of Fire' has been burning continuously for over 4,000 years, and it has been mentioned by Herodotus, and Plutarch.

During fire accident

1. When water cannot be used (because the equipment is plugged-in) or there is no water and the fire is not strong, you can use cooking soda or calcite soda, washing powder, sand, soil.
2. Keep your head no higher than 30 cm above the floor; above this height accumulation of heavy harmful gases may exists.
3. If there is no opportunity to leave the room, move towards a window, and try to get the attention of people by giving signals.
4. If your clothing has caught fire do not run because this will intensify burning. Take the clothes off, throw them in a safe place and put out the fire.
5. If you are near a fire in a forest and cannot extinguish the fire by yourself, immediately inform people who are nearby about the necessity to leave the hazard zone.



Tips to use fire extinguisher:

Put out small fire with fire extinguisher or cover the source of fuel with blanket. For fire extinguisher remember to use pull safety pin from handle. Aim at the base of the flame. Squeeze the trigger handle. And sweep from side to side at the base of the flame.

Things that must never be done during a fire

1. Never pour water on burning electrical equipment if it is switched on. If a TV set, a refrigerator is burning, turn off the electricity from the main switch.
2. Do not jump from windows of upper floors.
3. Do not panic.
4. Do not try to extinguish the fire by yourself.

8.3.4 Industrial Disasters

Industrial hazards consist of four principle hazards. The hazards encountered are fire, explosion, toxic release and environmental damage. This is because industries engage in different processes involving a wide range of different raw materials, waste products and final products. Danger originates from technological or industrial accidents, dangerous procedures, infrastructure failures or certain human activities. It may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation.

Fire: This is the most frequent hazard. Fire can also produce toxic fumes like Acrolein, Carbon monoxide and Cyanides. Physical structures can be damaged either by the intensity of the heat or combustion. It may also have an effect on essential services like power and instrumentation.

Explosion: Explosions is the result of a shock wave. This overpressure can kill people but usually the indirect effects of collapsing buildings, breaking of glasses and falling of debris causes far more loss of life and severe injuries. There are different types of explosions which include gas explosions and dust explosions. Gas explosions occur when a flammable gas mixes with air. Dust explosions occur when flammable solids, especially metals, in the form of fine powders are intensively mixed with air and ignited.

Chemical release: Sudden release of toxic vapours has the potential to cause death and severe injuries several kilometres from the release point. They are carried by water and air. Their release into public sewage systems, rivers, canals and other water courses, either directly or through contaminated water used in fire fighting can result in serious threat to public. The number of casualties depends on the weather conditions, population density in the path of the cloud and the effectiveness of the emergency arrangements.

Environmental Damage: Release of other substances, not directly toxic to humans can cause major pollution problems. It is becoming increasingly recognized that damage to natural resources such as plant and animal life can have serious long term consequences. E.g. destruction of trees is increasing the effect of global warming and extinction of animals are severely disrupting food webs and causing an increase in pests.

Means of reducing the industrial hazards

Process of Safety Management: Reliability assessment of process equipment, incorporating safety tips, scrubbing system, etc, should be done before effecting major process changes.

Safety Audits: Periodical assessment of safety procedures, performance of safety systems and gadgets along with follow up measures should be carried out.

Emergency Planning: A comprehensive risk analysis indicating the impact of consequences and practiced emergency procedures should be done. This can be done by communities as well as national or regional corporation authorities.

Training: Proper training of employees and protective services should be done.

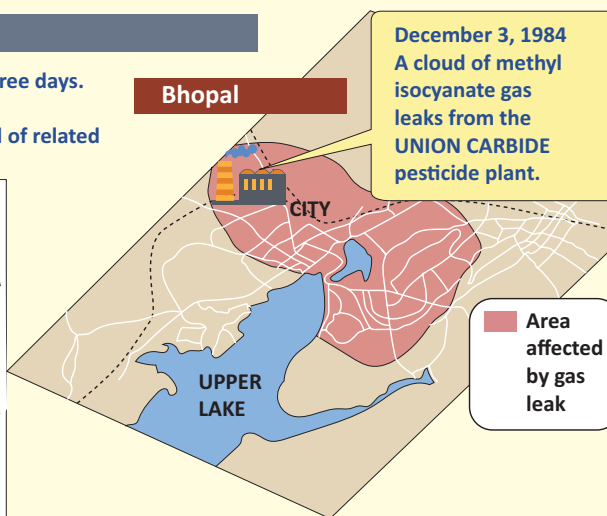
Fact File

The 1984 Bhopal Gas Disaster

The human cost (estimates)

Up to 10,000 deaths in first three days.

Additional 25,000 people died of related injuries by 1994.



8.3.5 Road accident

It is estimated that 1.34 million people are killed in the road accidents every year. Road accident is the 8th leading cause of death globally. Every year, up to 50 million people suffer serious, life-altering injuries which, in many low- and middle-income countries.

Primary road safety risk factors in low and middle-income countries include:

1. Speeding
2. Drink-driving
3. Non-use, or improper use of helmets, and
4. Non-use, or improper use of seatbelts

Strengthening the capability of the road traffic police to enforce traffic laws is fundamental to deterring road users from violating the laws, to reduce harm and to reduce inappropriate and unsafe behaviors on the roads.

Basic road safety rules for students:

1. Aware of the road signals

Assist students to learn the traffic lights and signs. Check out the relevance of each color:

- Green light is an indication for “go”- Whenever the signal turns green, the vehicle can move ahead.
- Red light is an indication “to stop”- All the vehicles have to stop, when the red light is on.
- Yellow light is an indication “to slow down”- When the yellow light turns on, you should slow down your vehicle and prepare to stop.
- “Walking man” signal at intersections are constructed for the pedestrians. Recall the fact that you will be authorized to cross the road only when the signal turns green.



Ensure that there are no vehicles, both on the left and right side of the road.

- Never attempt to cross the road, if the signboard signifies “Don’t walk” message or the walking symbol turns red.

2. Stop, look, and cross

In fact, students will either walk to school or to the bus stop for waiting their respective school bus. The only task of students is to cross the road prudently, right after the school bus drops them off. Hence, we should undertake the responsibility to provide adequate guidance for crossing the road cautiously.

We teach them to be aware of various road signs and recommend them to utilize the zebra crossing while crossing the road. If there are no markings or signs, the following procedures can be worthwhile:

- Check the right side, after that to the left side of the road for the incoming vehicles.
- If you notice a vehicle is approaching, wait for the vehicle to pass and then safely cross the road.
- Do not cross the road at the turns, it is unsafe.
- Never cross the road between the stopped vehicles.

However, accompaniment is required for the children aged below 6 years and you should compulsorily hold their hands while crossing the road.

3. Listen

Educate the child to be extra vigilant while they cross the road at the turns. As a consequence, listening can only aid them. For this reason, instruct your child to listen and ensure whether a vehicle is approaching or not. Ordinarily, vehicles apply horns at turns and at unmanned intersections to provide a warning to other road users. Meanwhile,

you can interpret the following instances to students:

- If a horn is heard, stop and cross only after ensuring that no vehicle approaches you from left or right side of the road.

4. Don’t rush on roads

Students will not be tolerant and have a tendency to dash across the road to reach the other side. In addition, they become absent-minded when they are having fun and henceforth bound across or along the road. Therefore, teach them to remain placid while they are near the road.

5. Relevance of Sidewalks

Persuade students to avail the service of sidewalks whenever they walk on the road. Demonstrate them how to cross the road safely. Motivate them to avail the sidewalks even though it is not a busy street.

6. Crossroads and pedestrian crossings

Students will have a tendency to scoot across the street. This will become particularly perilous since vehicles will never slow down unless there is a cross road or relevant signal. Notify your students to cross only at intersections and avail the pedestrian crossings. If there is no crossroad or pedestrian crossing, you can admonish students to comply the rules mentioned above.

7. Place the hands inside the vehicle

A multitude of students have the habit of placing their hands outside the vehicle while it is moving. They will lay their head out and wave with exhilaration. This is a familiar sight among the school bus students. Nevertheless, these behaviors can have significant consequences. Due to carelessness, they will be injured by vehicles, which advance from the opposite direction.

Back to School.

MOTORIST TIPS FOR CHILDREN'S SAFETY

What Can I Do?

Do Not Pass

It is illegal to pass a school bus that is stopped to load or unload children.

Seeing Yellow

School buses use yellow flashing lights to alert motorists that they are preparing to stop to load or unload children.

Seeing Red

Red flashing lights and an extended stop sign arm signals to motorists that the bus is stopped and children are getting on or off the bus.

All Stop

Traffic in both directions stop on undivided roadways when students are entering or exiting a school bus.

Stay Behind

Traffic behind a school bus (traveling in the same direction) must stop.

Crosswalks

Do not block the crosswalk.

Distance

Stop your car far enough from the bus to allow children the necessary space to safely enter and exit the bus.

Never Pass on Right

Never pass a school bus on the right.

Look Out

Take extra care to look out for children in school zones, residential areas, playgrounds and parks.

Stop

Always stop when directed to do so by a school patrol sign, school patrol officer or designated crossing guard.

Stay Alert

Children are the least predictable pedestrians and the most difficult to see.

Don't Honk

Don't honk your horn, rev your engine or do anything to rush or scare a child in front of your car.

8. Never cross road at bends

Bends are evidently the blind spot for motorists. When you attempt to cross at bends, the driver will be unable to recognize you and stop the car at the right time. As a result, students will be hurt while crossing at bends.

9. Remain safe on a bicycle

If students ride bicycle to reach the school, ensure that they adhere to the following cycling rules:

- Utilize the bicycle lane. If such a lane does not exist, ride the bike either on the extreme left or right side of the road and glide along with the traffic.
- Never permit your students to ride on congested streets without your supervision.

10. Staying safe in a moving vehicle

In a moving vehicle, you can ensure the student's safety with the assistance of a seat belt. Let them practice the following safety rules in your absence:

- Never stand, stroll or sprint inside a moving vehicle.
- Remain seated and hold the rails on the seats until the school bus halts.
- Do not put your hands outside the moving vehicle.









11. Get off the vehicle at the curb side

Ask your students to memorize the following safety tips and conform to the rules while they get down from the school bus:

- Ensure that you reach the bus stop prior to the scheduled bus timing in order to avert the circumstance of running behind the school bus.
- Form a queue to board or descend the school bus.
- Disembark the school bus at the curbside in order to evade unnecessary endangerment and hindrance to other vehicles.



Top 10 Road Safety Tips for Children

- | | | | |
|---|--|---|--|
| 1 Crossing the road
On a green light, look both ways and listen for traffic before crossing |  |  | 6 Getting off a bus
Watch out for cars or motorcycles when getting off |
| 2 Around the corner
Do not run into the roadway |  |  | 7 Crossing the road without signal lights
Pay additional attention before crossing |
| 3 Do NOT jaywalk
Make sure to use a crosswalk |  |  | 8 Wear a seat-belt
Children under 13 are safest in the back seat |
| 4 Watch out for big cars
Stay away from big cars turning the corner |  |  | 9 Do NOT play between cars
stationed side by side |
| 5 Do NOT play behind cars
Drivers may not be able to see you |  |  | 10 Use safety gear on bicycles and in-line skates
Use bicycle lanes when available |

A-Z GLOSSARY

- 1. Disaster:** A serious disruption of the functioning of a society involving human, and material, and impacts that exceed the ability of the affected society to cope using its own resources.
- 2. Disaster risk reduction:** The practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters.
- 3. Mitigation :** The lessening of the adverse impacts of hazards and related disasters
- 4. Preparedness:** The capacity developed by organizations, to effectively anticipate, respond to, and recovers from the impacts of disaster events.
- 5. Prevention:** The outright avoidance of adverse impacts of hazards and related disasters.
- 6. Public awareness:** The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken, to reduce vulnerability to hazards.
- 7. Resilience:** The ability of a society exposed to hazards to resist, absorb, adapt to and recover from the effects of a disaster.
- 8. Hyogo Framework for Action** – a global blueprint for disaster risk reduction efforts between 2005 and 2015 – by providing specific operational guidance for promoting disaster risk reduction.



Exercise

I. Choose the Correct Answer



1. The spreading speed of low fire is
 - a) 1 – 3 m/sec
 - b) 3 – 5 m/sec
 - c) 4 – 6 m/sec
 - d) 6 – 8 m/sec
2. It is important to practice Drop, Cover, Hold for
 - a) Fire
 - b) Earthquake
 - c) Lightning
 - d) Flood
3. To cut off all branches of trees standing near our house is to prevent
 - a) Earthquake
 - b) Flood
 - c) Fire
 - d) Drought
4. Which one of the following is the rule of action for stampede?
 - a) Find lower place or cavity and squat there if the area is open.
 - b) Avoid rock slides and landslides if you are in the mountain.
 - c) Keep your hands by your chest
 - d) Keep your head no higher than 30 cm above the floor.
5. The 1984 Industrial gas disaster occurred in
 - a) Delhi
 - b) Pune
 - c) Bhopal
 - d) Noida
6. The percentage of death worldwide due to unintentional injury during drowning is _____.
 - a) 5%
 - b) 7%
 - c) 10%
 - d) 2%
7. The natural gas vent known as the Eternal fire of Baba Gurgur is located at which country?
 - a) Iran
 - b) Iraq
 - c) Yeman
 - d) Kuwait
8. Every year, _____ people are killed in the road accidents.
 - a) 4.34 million
 - b) 2.34 million
 - c) 3.24 million
 - d) 1.34 million
9. In India _____ of stampede occur in religious events.
 - a) 69%
 - b) 59%
 - c) 79%
 - d) 49%
10. Drowning account for _____ of deaths in flood disasters.
 - a) 75%
 - b) 65%
 - c) 55%
 - d) 85%



II Very short answer

11. Why should not we cross roads at bends?
12. What are the causes of fire accident?
13. List major areas of stampede.
14. Write any three preventive measures of fire accident.
15. Write any two road safety risk factors.

III Write the short answer

16. Why are we drowning faster in fresh water than ocean water?
17. Write any three do's during fire accident.
18. Mention any two means of reducing industrial hazards.
19. Write any three preventive measures of drowning.

IV Write in detail

20. List the basic road safety rules for students and explain any three of them.
21. Write any three do's and don'ts for fire accidents.
22. Explain the rules of action during Stampede.

V Mock drill exercise

1. Prepare a school disaster management plan focusing on the following mock drills that can be scheduled to be conducted by the various committees.
 - I. Drop, cover, roll mock drill for fire
 - II. Stampede

VI Group discussion

1. Discuss in group how you can manage stampede suppose you are trapped in the crowd in a festival site/ Mall. Draw easy exit route map of the site and discuss about.



References

1. Introduction to Disasters (reference – unisdr.org, 2006 edition)
2. Disaster Mangement module. TNSCERT.
3. Farabi, Hamid. "Safety: A major objective in the Chemical and Petroleum Industry." 1992.
4. Mannan, Sam. Lee's Loss Prevention. Oxford: Elsevier Butterworth Heinemann, 2005.