

MANUAL ON FIRE

Causes, Effects & Preparedness



UN HABITAT
UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME

Scope of the Manual

This manual is developed with wider consultations and inputs from various relevant departments/ministries, UN Agencies, INGOs, Local NGOs, Professional organizations including some independent experts in specific hazards. This is intended to give basic information on WHY, HOW, WHAT of a disaster. It also has information on necessary measures to be taken in case of a particular disaster in pre, during and post disaster scenario, along with suggested mitigation measures. It is expected that this will be used by the school teachers, students, parents, NGOs, Civil Society Organizations, and practitioners in the field of Disaster Risk Reduction.

Excerpts from the speech of Ban Ki-moon, Secretary-General of the United Nations

Don't Wait for Disaster

No country can afford to ignore the lessons of the earthquakes in Chile and Haiti. We cannot stop such disasters from happening. But we can dramatically reduce their impact, if the right disaster risk reduction measures are taken in advance.

A week ago I visited Chile's earthquake zone and saw how countless lives were saved because Chile's leaders had learned the lessons of the past and heeded the warnings of crises to come. Because stringent earthquake building codes were enforced, much worse casualties were prevented. Training and equipping first responders ahead of time meant help was there within minutes of the tremor. Embracing the spirit that governments have a responsibility for future challenges as well as current ones did more to prevent human casualties than any relief effort could.

Deaths were in the hundreds in Chile, despite the magnitude of the earthquake, at 8.8 on the Richter Scale, the fifth largest since records began. In Haiti, a less intense earthquake caused hundreds of thousands of deaths. Haiti had non-existent or un-enforced building codes, and very poor preparedness.

The lessons are universally applicable. No country is immune from disaster, be it earthquakes or floods, storms or heatwaves. More and more intense natural disasters are affecting all five continents, we believe as a result of climate change. Many of the world's poorest people live in high-risk densely populated cities in flood or earthquake zones, or both.

The culture of disaster risk reduction must spread. I am encouraged that we already have a head start in this regard. The Hyogo Framework for Action, a 10-year plan to make the world safer from disasters triggered by natural hazards, was adopted by 168 governments in 2005. Hyogo gives national authorities a blueprint to assess and reduce risks through planning, training, and better public education. For example, making sure that schools, hospitals, and other key public infrastructure meet certain safety standards.

There has been progress. Bangladesh lost more than 500,000 people during Cyclone Bhola in 1970. It subsequently built 2,500 cyclone shelters on elevated concrete platforms and trained more than 32,000 volunteers to help in evacuations. When Cyclone Sidr struck in 2007 with an enormous sea surge, the death toll was less than 4,000. Cyclone Nargis, a similar event in unprepared Myanmar in May 2008, cost 140,000 lives. Cuba weathered four hurricanes in 2008. It sustained \$9 billion of physical damage but very few lives were lost.

The evidence is overwhelming. Yet the lessons of these disasters are forgotten with depressing speed. We know prevention actually saves governments money in the long run. When China spent \$3.15 billion on reducing the impact of floods between 1960 and 2000, it averted losses estimated at about \$12 billion. Similar savings have been recorded in Brazil, India, Vietnam and elsewhere.

Everyone has a role to play.

Governments, central and local, have to do what it takes to make communities able to cope with both continuing challenges and sudden shocks.

The Chile and Haiti earthquakes showed us once again why action *before* disasters makes all the difference. To prevent natural hazards turning into disasters, we must all act sooner and act smarter.

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Chapter 1

Introduction to Fire

1.1 What are fires?

Fire or combusting is a chemical chain-reaction accompanied by evolution of intense heat and light.

Fire or combustion occurs when three elements react:

1. Fuel - fuel or combustible materials, e.g. newspapers, clothing, curtains, carpet, furniture, etc.
2. Oxygen - present in the air.
3. Heat - flames, electricity, hot metal, or even a tiny spark of fire.

Figure 1.1: The three elements of fire



If conditions are right, a fire can start almost anywhere at any time. If all three are not present in sufficient quantities, a fire will not ignite or a fire will not be able to sustain combustion. Combustion will continue as long as these three factors are present. If one of them is removed, the fire will be extinguished.

1.2 Causes of fires

The major causes of fire in residences include:

- Residential accidents such as improper use of electrical appliances, faulty connections, grease fires, smoking, heating appliances, or improper disposal of wood ashes, negligence of kitchen fire,
- Industrial accidents such as hazardous material incidents, explosions, transportation accidents,
- Criminal acts such as arson, illegal explosive devices, acts of terrorism, and
- Acts of nature such as lightning strikes, earthquake by-product.



Fire after 9-11 terrorist attack in US

The major causes of forest fire can be categorised into natural and man-made. The common natural causes of wildfires are lightning and friction of tightly packed trees. However, most forest fires/wildfires are caused directly or indirectly by people, for example, fires can spread when farmers burn the land to make it more fertile. Fires can also start when people are careless while cooking in the woods or using campfires. Sometimes, people even start fires intentionally (arson). If it gets out of control, fire can become dangerous both for people and nature.

1.3 Potential impact

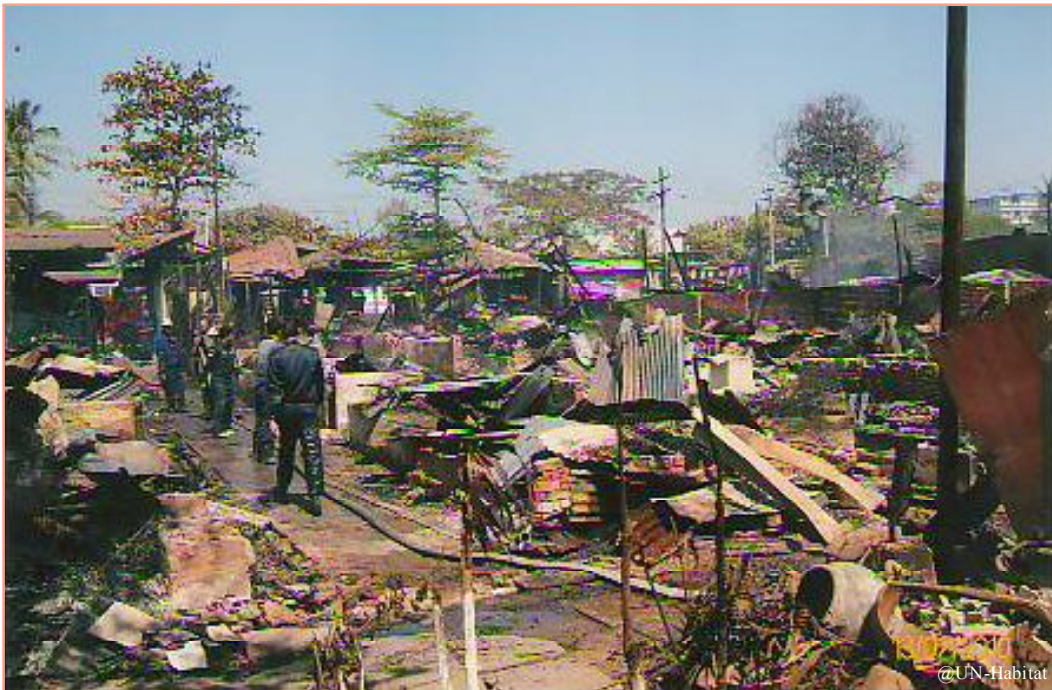
If a fire in human settlement cannot be suppressed or controlled in time, it can lead to the following destruction:

- Destruction of housing, warehouses, factories, workplaces, household items and food supplies;

- Casualties caused when people are trapped in buildings on fire, burns and injuries,
- Injuries sustained by large numbers of people when fires spreading through sparks,
- Disruptions of transportation and economic activity.

Significant impacts of forest fire can be summarised as follows:

- Loss of invaluable forest product,
- Threat to watershed areas,
- Threat to wildlife,
- Threat to recreational facilities and resorts located within forest reserves,
- Loss of fodder,
- Threat to the economy.



Thingangyun Market after a big fire in Feb, 2010

Chapter 2

Fire Hazard in Myanmar

2.1 The trend of fire incidents in Myanmar

Fire hazards account for 70 percent of disasters in Myanmar and annual losses are approximately 1 billion kyats.

The trend of annual fire cases from 1983 to 2009 is shown in Figure 2.1.

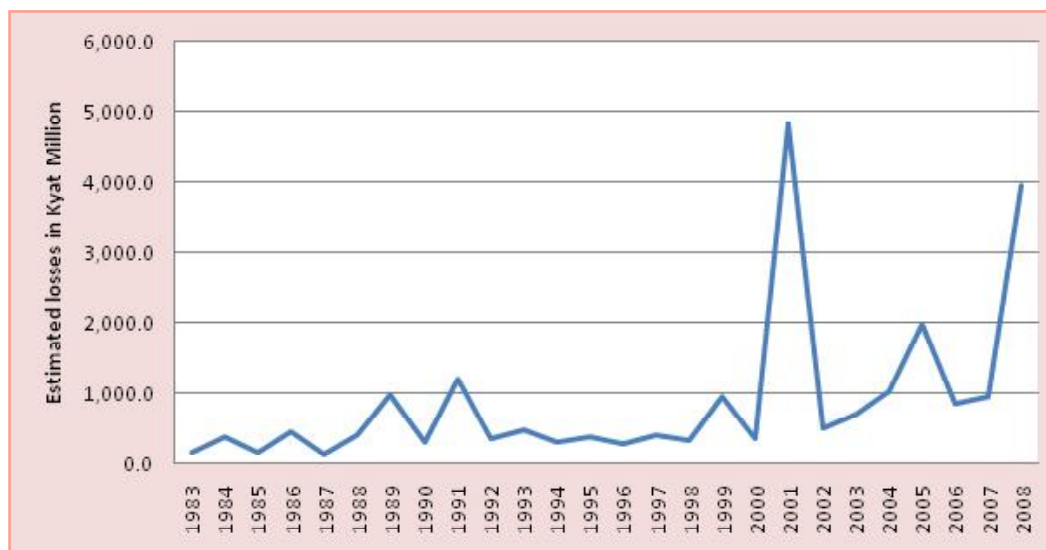
Figure 2.1: Fire Cases in Myanmar (1983 to 2009)



Source: Fire Services Department

Fire cases often lead to loss of human lives and properties. The value of property loss depends on the fire's intensity, the location and the duration of the blaze. The estimated loss of property during 1983 to 2008 is shown at Figure 2.2.

Figure 2.2: The Estimated Lossess due to Fire Cases in Myanmar
(1983 to 2008)



Source: Fire Services Department

2.2 Major causes of fire in Myanmar

The causes of urban fire in Myanmar

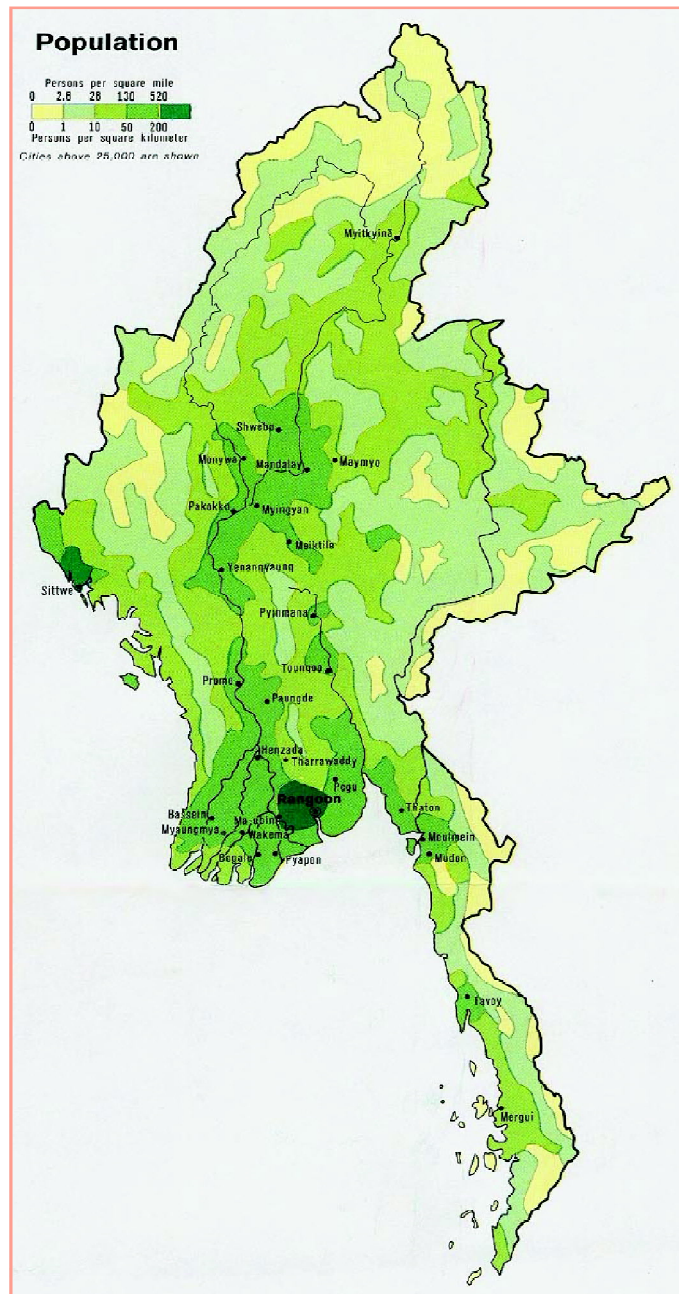
Generally, the high incidences of urban fire in Myanmar are due to climatic conditions including temperature, use of flammable construction materials, increasing urban development and people's negligence when using fire.

a) Climatic conditions: Myanmar does not receive rainfall all year round. The wet season lasts for about five months and the dry period for the remaining seven months. The hot season is from mid-February to mid-May. The maximum temperature reaches up to 40°C in the central dry zone during the peak hot season.

b) Urban development: The population of Myanmar is 57.5 million (2008). Among the 14 states/divisions, Mandalay Division is the most populous, Ayeyarwady is the second and Yangon the third. Comparing population density among states and divisions, Yangon division has the highest density, followed by Ayeyarwady and

Mandalay. Hilly regions are sparsely populated and Chin State has the lowest density. The average population density for the country as a whole is 201 persons per square mile. The population density map is shown in Map 2.1.

Map 2.1: The Population Density Map of Myanmar



With the increased urbanisation in Myanmar, big cities and towns become more populous. To fill the growing urban population's need for housing, construction and extension of buildings, apartments and houses are taking place at a speedy rate; this includes an expansion in the number of slums and improper houses. However, the enforcement on land use planning and building design for fire safety is still weak. The crowded population, congested houses and careless handling of electrical appliances and fuels often lead to perilous fire cases.

c) Flammable construction materials: A majority of households in Myanmar lives in dwellings with thatched roofs, bamboo walls and wood plank floors.

Roofing - In rural areas, 60.8 percentage of dwellings are made of thatched roofs and 31.3 percentage of roofs made with corrugated metal. In urban areas, the most common material for the roof is corrugated metal.

Walls - Dwellings with bamboo walls are most common in rural areas with 57.4 percentage of dwellings compared to 37.7 percentage in urban areas. In urban areas, 25.8 percentage of dwellings have walls made of cement.

Floors - The construction materials for the floor of the dwelling consists mostly of wood planks (53.6 percentage) and palm or bamboo (26.5 percentage) in rural areas. In urban areas, wood plank is also the most common material for floors (45.1 percentage), but it is followed by cement (20.5 percentage).

In rural areas, people prefer to live in bamboo houses with thatched roof made of bamboo shaves and Nipa palm leaves (Dha-Ni) as these materials are inexpensive, locally available, do not require sophisticated technology and suit the local weather conditions. Even in sub-urban and urban areas, a considerable portion of the houses are made of bamboo walling and wood plank flooring. These materials are highly flammable.



Typical houses in the rural area of Myanmar

d) People's negligence when using fire: Regardless of location, urban or rural areas, uncovered cinders left after cooking with wood and charcoal, candles left alight after use, exposure of naked flames, and unattended mosquito coils near diesel, petrol and engine oils may lead to accidental fire.

The causes of forest fire in Myanmar

Forest fire (wild fire) is usually surface fire that has spread over a large area but has not turned into intensified burning. Forest fires are most frequent during the dry season, usually from December until May, when the trees in forest shed leaves.

Besides the natural causes of lightning and friction of tightly packed trees, the following man-made causes are responsible for the majority of incidents:

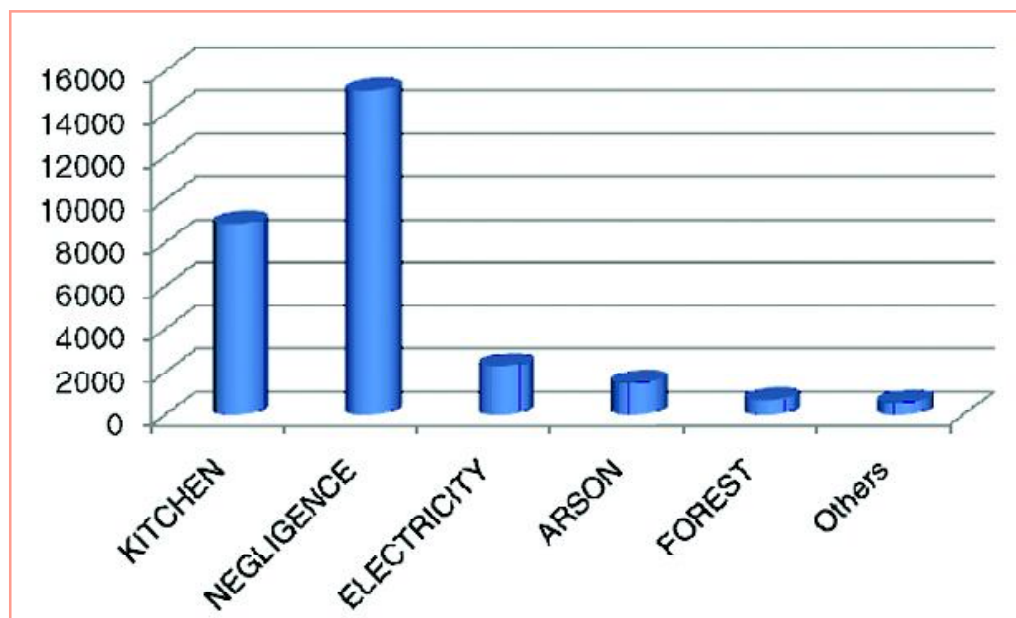
- Shifting (slash and burn) cultivation,
- Deliberate burning of the forest for hunting purposes,
- Careless use of fire (smoking or cooking) in the forest,
- Blazing the tree trunk intentionally for collection of lacquer,
- Purposeful burning of fodder ground to make room for the growth of new grass.

According to the Fire Services Department (FSD) of Myanmar, the major causes of fire incidences are categorised as follows:

- Kitchen fire
- Negligence in using fire
- Improper use of electricity
- Arson
- Forest fire
- Others

Based on the number of fire cases recorded between 1983 and 2009, negligent fire use is the most common cause of fire in Myanmar, followed by kitchen fire and improper use of electrical appliances (Figure 2.3).

Figure 2.3: Major Causes of Fire Cases in Myanmar (1983-2009)



Source: Fire Services Department

2.3 Fire risk map

Myanmar is vulnerable to natural and man-made fires right across the country. Fire is especially likely in the dry zone and densely populated areas. Due to the excessive forest coverage throughout the country, forest fire incidents (although sporadic) are found in almost all states and divisions. However, they are particularly common in upland regions of divisions and states such as Bago, Chin, Kayah, Kachin, Mandalay, Rakhine and Shan.

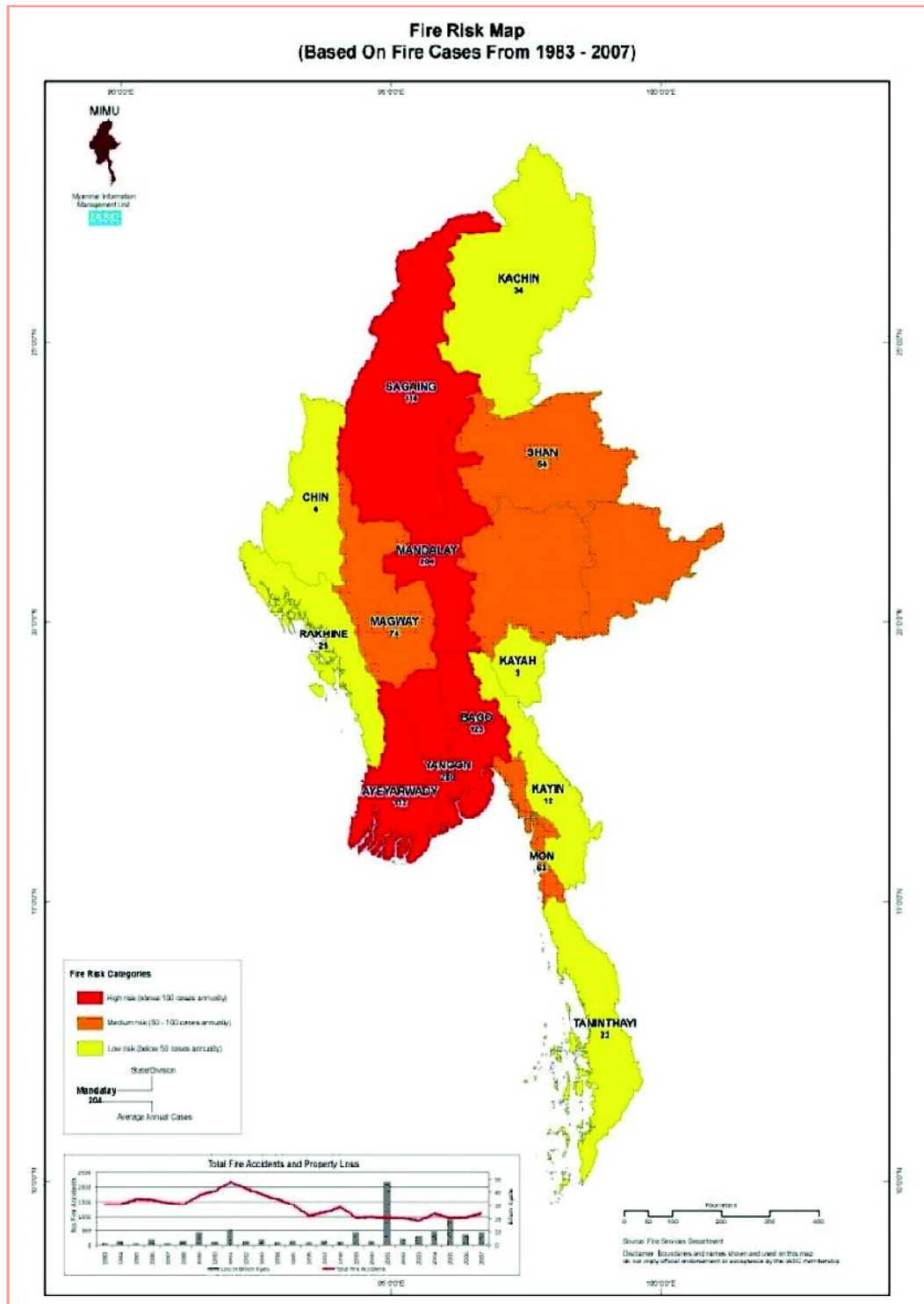
Based on the fire incidents between 1983-2007, the states and divisions have been categorised into high, medium and low fire risk zones (Map 2.2).

High risk zones: Yangon, Bago, Ayeyarwady, Mandalay, Sagaing

Medium risk zones: Magway, Mon, Shan

Low risk zones: Rakhine, Kachin, Kayah, Kayin, Chin, Tanintharyi

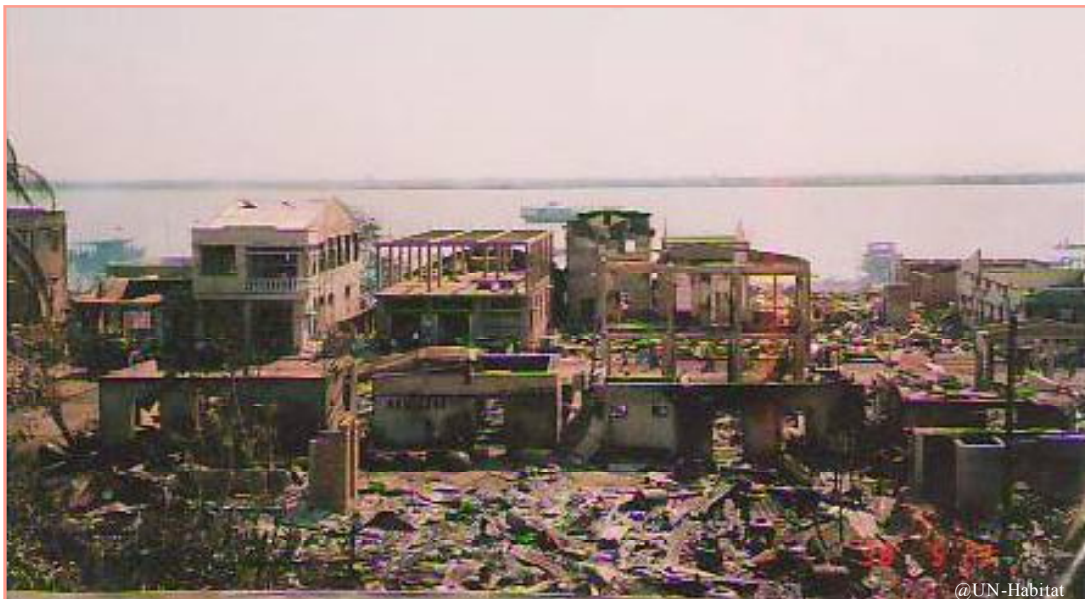
Map 2.2: Fire Risk Map (based on fire cases from 1983 to 2007)



Source: Hazard Profile of Myanmar

2.4 Major fires in Myanmar with loss and damage data

- 1) The Mandalay fire of 1984 broke out on 24 March and spread to three townships. A total of 2,368 buildings were lost, affecting 22,324 people in 4,585 households. Losses totalled up to kyats 780 million.
- 2) The Meikhtila fire of 1991 broke out on 7 April. A total of 3,261 buildings were lost, affecting 25,377 people in 5,026 households. Losses ran to about kyats 685 million.
- 3) The Maing Shu fire of 1999 broke out on 28 March. A total of 658 buildings were lost and one person died. The fire affected 7,445 people in 1,847 households and financial damages totalled around kyats 550 million.
- 4) The Myeik fire of 2001 broke out on 23 December. A total of 1,377 buildings were lost, affecting 15,443 people in 2,676 households. Losses ran to around kyats 4,000 million.
- 5) The Labutta fire of 2003 broke out on 10 January. A total of 153 buildings were lost, affecting 639 people in 157 households. Damages totalled around kyats 235 million.



Labutta after a big fire in January 2003

- 6) The Kyaikhtiyo Pagoda fire of 2004 broke out on 27 January between Kyaikhtiyo Hill and Hunter's Hill in Kyaikhto township, Mon state. A total of 96 shops and 30 residential huts were lost, killing one person. The fire affected 563 people in 126 households and cost around kyats 400 million.
- 7) The A-Phyauk oilfield fire of 2004 originated from forest fires near Kywe Bakan Chaung village, A-Phyauk and Taik-Kyi township in Yangon Division. It spread to the No. 13 oil well of A-Phyauk oilfield on 12 February.
- 8) The 2005 fire in Hlaing township, Yangon Division, affected 9,145 people, with losses running up to about kyats 80 million.
- 9) The 2007 fire of Pyapon township, Ayeyarwady Division, occurred in Phonegyi Thaung village and affected 3,085 people. The sum of the losses incurred was around kyats 102 million.
- 10) The 2008 fire of Pulaw, Tanintharyi Division, affected 1,400 people and an estimated kyats 2,200 million.
- 11) The 2008 fire of Mandalay Yadanabon Market, broke out in February 2008, a total of 1,512 shops were lost, led to total loss of Kyats 2,645 million.



Mandalay Yadanabon Market on fire, Feb. 2008

Chapter 3

Fire Prevention, Preparedness and Response Measures

3.1 Fire Prevention and Preparedness Measures

The community is at the heart of understanding, planning and implementing fire prevention measures. However, government intervention in policy, guidelines and enforcement for fire prevention and mitigation of loss and damage are also important.

a) Institutional mechanism of fire services at nation level in Myanmar

In Myanmar, the Fire Services Department (FSD), under the Ministry of Social Welfare, Relief and Resettlement, is the nodal department for fire mitigation, preparedness and response measures. It seeks to prevent and protect communities against fire disaster which incurs losses and endangers the lives and properties of people and state-owned capital investment. The department also aims to form and train fire service personnel and voluntary firefighters. The main responsibilities are:

- Fire precaution,
- Fire prevention,
- Fire extinguishing,
- Social and humanitarian services, and
- Organising and capacity building of the auxiliary and voluntary firefighters.



The headquarter of the Fire Services Department in Yangon

The headquarters of the FSD is in Yangon and has three areas of control: namely Upper Myanmar, Lower Myanmar and Nay Pyi Taw. They have opened offices at the state/division and township levels. Out of 326 townships in Myanmar, FSD has offices in 45 townships. These include 550 fire stations, of which 222 are government-owned and 328 are voluntary. The township fire stations are divided into three grades: “A” grade comprising of over 21 firefighters, “B” grade over 10 firefighters and “C” grade over eight firefighters. At present, there are 4,228 fire services personnel and about 240,000 voluntary firefighters.

b) Human settlement planning

In order to mitigate potential losses due to fire, the necessary consideration for fire should be integrated into human settlement planning. These considerations include easy access for fire-engines to the inhabitants and open space to be used as fire break near the wards and villages, etc.

c) Building codes

Fire safety building codes should be prescribed, enforced and applied to the construction of buildings. Especially, high-rise buildings should use architectural designs which provide emergency fire-fighting measures, fire-escapes and emergency ladder systems. Emergency exits and ladders should also be included in construction of public buildings, such as hospitals, schools, markets, cinema-halls, hotels, motels, factories, workshops, and fire-prone enterprises.



Fire escape ladder system in a high-rise building

d) Fire insurance scheme

Fire insurance ensures coverage against the losses resulting from fire. It is an effective tool of risk transfer for the people. Myanmar

Insurance Enterprise offers fire insurance scheme which should be widely promoted throughout the country.

e) Public awareness generation

The major cause of fire cases in Myanmar is people's negligence when using fire. In response, public awareness activities on fire hazard should be carried out intensively and continuously. Radio and television broadcasts on fire prevention and preparedness should be conducted to educate the public. Moreover, educational activities through newspapers, journals, magazines, pamphlets and billboards are effective tools for public awareness generation.

At the community level, especially in the dry season, the community-based disaster management organisation should frequently remind the community members to be alert for fire, to use fire with care, and to keep fire extinguishers and locally available materials for extinguishing fire (such as fire-hook, fire-flat, sand, water and buckets) at home.

f) Capacity building for fire fighting and drills

At the national level, the Central Fire Services Training School is at Pyin Oo Lwin, which conducts 11 types of courses ranging from six-week rescue (life-saving) courses to 24-week fire officer courses. The Fire Services Training School, Yangon, conducts 12 types of training courses including basic and advanced fire-fighting, vehicle driving, office clerk training, a rescue technique course, a refresher course for volunteers, aircraft fire-fighting and a rescue training course.

At the community level, with the technical assistance of the FSD, basic fire-fighting courses are provided for community-based rapid response teams. The team members and volunteer groups are trained to put out fires with commonly available materials such as water, sand, portable fire extinguishers and fire pumps. Community people should actively participate in fire-fighting demonstrations, rehearsals and drills which are occasionally organised by local

authorities and with technical cooperation from the Fire Services Department.

g) Fire extinguishing facilities

Communities should ensure that sufficient numbers of fire prevention equipment, fire extinguishers and a reserve water supply are stored in markets, factories, workshops and industrial zones. The inhabitants in a ward/village and town should have access to fire hydrants and fire-fighting reservoirs to get sufficient water for fire-fighting. Modern fire-engines should also be used for fire-fighting on the upper levels of high-rise buildings in cities.

Furthermore, every house in the community should keep fire extinguishers, fire-hooks, fire-flats, sand bags at the ready. In big markets, fire alarm systems must be installed and market fire-fighter teams should be set up. Fire-fighting demonstrations and drills should be inclusive of all those who work in the markets.



A fire hydrant in a ward

h) Fire watch system

Fire watch system has been already practised in the Myanmar community. The duty of fire-watching throughout the entire night is alternately assigned to the families and households in the ward/village. The common signal for fire alert _ knocking on an iron plate by using an iron rod _ is already used and familiar to the community.



A fire watch station in a community

i) Community-based Organisation on Disaster Risk Reduction

Ideally, the community has already formed a Community-based Organisation (CBO) on Disaster Risk Reduction (DRR). If not, the community should organise a CBO comprising the stakeholders of the community. Under the CBO on DRR, a number of sub-groups or teams should also be set up to carry out different disaster management activities, such as early warning dissemination, evacuation, search and rescue, first aid, relief operation, etc.

j) Community-based Disaster Management Plan

The CBO should prepare a Community-based Disaster Management Plan (CBDMP) with the help of government departments, NGOs, community leaders, and with the active involvement of community members. The list of activities which the community members are required to perform in preparation for specific disasters, including fire, should be included. It should also identify the duties and responsibilities to be carried out by individuals in the community so that they are aware of their particular responsibilities when a fire breaks out in the community. Once the plan is prepared, it is to be shared throughout the community in different formats. These include informing the community assembly, posting information on the notice board of the village/ward, Peace and Development Council, monasteries/churches, markets, etc. Everyone in the community is required to clearly understand the full contents of the plan. The plan should also be evaluated on its effectiveness through drills and actual experience. Updates will need to be made periodically or regularly at predetermined intervals.

k) Community-based preparedness and prevention activities

As most accidental fires are caused by people, many of them can be prevented. Some activities which can be performed collectively to prevent fires in the community are mentioned below:

- Create fire breaks (such as a green lawn, or well-spaced trees) 10-30 feet around your home.

- Clear debris, prune dead and thin trees near any buildings.
- Keep surrounding areas of the ward/village clean.
- The roads in the village / ward should be wide enough for fire engines to enter.



If the roads in a ward/village is not wide enough for fire engines to come in, fire will not be extinguished before it spreads to a larger area.

- The roads should not be blocked by anything (such as temporary signboard, social occasions, etc) at any time.
- The community should have enough water sources for fire fighting; if not, make the necessary arrangements to gain access to water, such as digging pools, wells, or requesting/installing fire hydrants.
- Follow the instructions, disciplines given by the FSD and Fire Prevention and Supervision team or Community-based Organisation on Disaster Risk Reduction.
- Cooperate and participate in the community's fire watch system;
- Assist and cooperate whenever your local fire brigade inspects your home/community's fire safety and follow their recommendations;

- Ensure public participation for fire prevention;
- Ensure to have readily available alarm-raising tools for emergencies, such as an iron rod, *Kalartet*, *Phar Si*, gong.
- Grow shady and wind-break trees; and
- Support the FSD with repair and strengthening of fire engines so that they will be available at full capacity at any time.

1) Fire prevention and preparedness at household level

There are several measures that can be undertaken to avoid the possibility of a fire occurrence. Every household should take necessary prevention and preparedness actions to prevent fire outbreak. Fire extinguishers, fire hooks, fire flats, water buckets and sand buckets should be stored in every house.

Here are specific measures you can adopt:

i) Fire alarm system/ Smoke detectors

If you are living in a big house, in an apartment or in a high-rise building:

- Install smoke or heat detectors.
- Place smoke detectors on every level of your residence. Place them on the ceiling or high on the wall (4 to 12 inches from ceiling), at the top of open stairways, or at the bottom of enclosed stairs and near (but not in) the kitchen.
- Test and clean smoke detectors once a month and replace batteries at least once a year. Replace smoke alarms once every 10 years.

ii) Fire escape system

- Review escape routes with your family. Practise escaping from each room.

- Ensure you have escape ladders if your residence has more than one level. Never block the escape ladders.
- Teach family members to stay low to the floor (where the air is safer in a fire) when escaping from a fire.

iii) Storage

- Clean out storage areas. Do not let trash, such as old newspapers and magazines accumulate.
- Work areas, aisles, walkways, stairways and equipment should be kept clear of loose materials, trash, scraps, etc.
- Never block aisles, fire exits, emergency equipment or alarm pull stations with equipment or materials.
- Avoid build-up of combustible trash and waste such as paper, wood, cardboard, etc.

iv) Flammable substances

- Keep use and storage of flammables and combustibles to a minimum.
- Never use gasoline, benzine, or similar flammable liquids indoors.
- Store flammable liquids in approved containers in well-ventilated storage areas.
- Never smoke near flammable liquids.
- Discard all rags or materials that have been soaked in flammable liquids after you have used them. Safely discard them outdoors in a metal container.
- Keep open flames away from walls, furniture, drapery and flammable items.
- Keep matches and lighters up high, away from children and, if possible, in a locked cabinet.
- Repair leaky gas connections.

- Store weed-killers, pesticides and flammable products away from heat sources.
- Place oily polishing rags or waste in covered metal cans.

v) Electrical Wiring

- Ensure proper electrical wiring in your residence checked by an electrician.
- Inspect extension cords for frayed or exposed wires or loose plugs.
- Make sure outlets have cover plates and no exposed wiring.
- Make sure wiring does not run under rugs, over nails or across high-traffic areas.
- Do not overload extension cords or outlets.
- Make sure insulation does not touch bare electrical wiring.
- Change old wires/cables.
- Do not use broken electrical appliances.
- Do not use over-strength fuses.
- Make sure you switch off and unplug the electric stove/iron after use or after the electricity cuts out.
- If there is an electric shock, switch the main power off before attempting to put out the fire. Cover with a dry cloth to extinguish the fire.

vi) Smoking

- Dispose of cigarette butts correctly. Douse cigarette and cigar butts with water before disposal. It might end up in an area that has a dangerous accelerant and may spark a fire.
- Never smoke in bed or when drowsy or medicated.
- Store ashes in a metal container outside and away from your residence.

vii) Campfire

- Never play with matches. One stick can burn the whole forest.
- Never make a campfire without the help of adults.
- If the weather is windy and dry, do not organize a campfire.
- If the conditions are good and you decide to make a campfire, select an open place, far from trees, dry leaves and branches. Clean the earth of rubbish for three meters around the place for the campfire.
- Never leave a fire alone.
- Before leaving the area, put out the fire carefully with water and soil.
- Keep the forest environment clean. Do not leave bottles or glass litter in the forest. They might act as a magnifying glass, reflect the sun's rays and start a fire.

viii) Using a stove

- Diminish the fire after use. Do not leave any small particle of fire after use.
- Always make sure an adult stays near the stove.
- Do not store any fuel near a fire stove.
- Do not let children, old people and differently-able people use a fire stove.
- If the time interval for using fire is instructed by the local authority or FSD (especially in the hot season), follow the instruction.
- Keep sufficient fire-proof partitions near a fire stove, such as sand buckets and water buckets.
- In huts, use stoves attached to the ground during the hot season.

3.2 Response Measures for Fire

Extinguishing a fire at the source can limit damages. If households keep the fire extinguishers or locally available fire extinguishing materials at the ready, and household and community members know how to use them effectively, fires in their early stages can be put out at once.

a) Fire extinguishers

Fire extinguishers are very effective life-saving tools if they are used properly. Fire extinguishers come in different varieties. It is important to choose the right kind of extinguisher for putting out different types of fire. Check for the following symbols on the label of fire extinguisher.



Components of a fire extinguisher

Types of fire extinguisher

Fires have been classified into five categories based on the type of fuel.

Type A = a fire that is burning from wood, rubbish, paper and other ordinary fuels.

Type B = fires that involve flammable liquids, such as gasoline, petrol and paint.

Type C = fires that involve electrical equipment, transformers and electrical appliances.

Type D = fires that are burning from combustible metals such as magnesium.

Type E = fires stemming from animal/vegetable fats, etc.

Water extinguishers - water extinguishers are the cheapest and most widely used fire extinguishers. They are used for class A fires and are not suitable for class B (liquid) fires, or where electricity is involved.

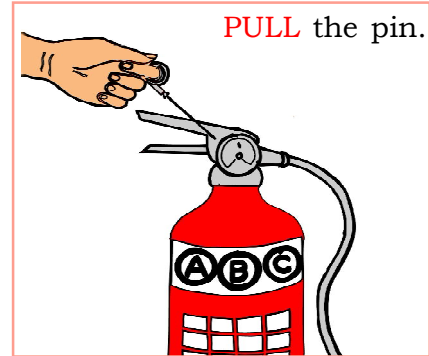
Foam extinguishers – this type is more expensive than water, but more versatile. It is used for classes A & B fires. Foam spray extinguishers are not recommended for fires involving electricity, but are safer than water if inadvertently sprayed onto live electrical apparatus.

Carbon dioxide - Carbon dioxide is ideal for fires involving electrical apparatus, and will also extinguish class B liquid fires, but has NO POST FIRE SECURITY and the fire could re-ignite.

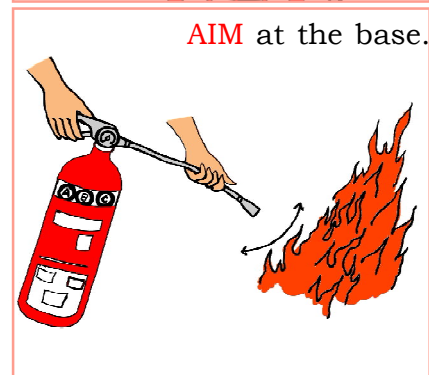
How to use a fire extinguisher properly

Remember the acronym **PASS**.

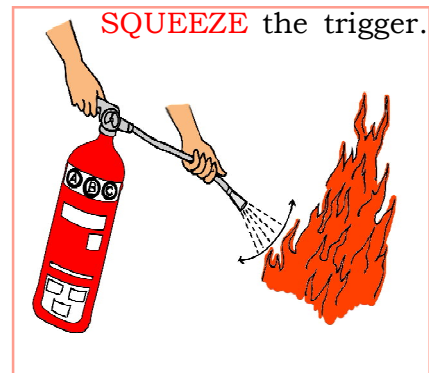
P - Pull the pin - the pin releases a locking mechanism and will allow you to discharge the extinguisher.



A - Aim at the base - not the flames. This is important - in order to put out the fire, you must extinguish the fuel.



S - Squeeze the trigger - this will release the extinguishing agent in the extinguisher. If the handle is released, the discharge will stop.



S - Sweep from side to side - using a sweeping motion, move the fire extinguisher back and forth until the fire is completely out. Operate the extinguisher from a safe distance, several feet away, and then move towards the fire once it starts to diminish. Be sure to read the instructions on your fire extinguisher - different fire extinguishers recommend operating them from different distances.



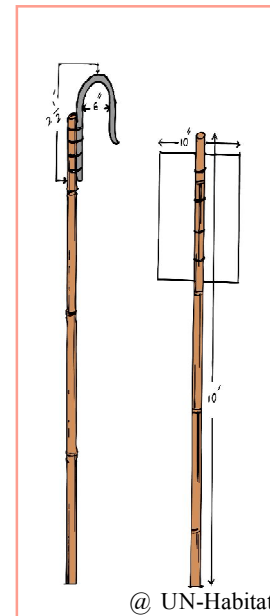
@ UN-Habitat
Using a fire extinguisher

b) Traditional methods of fire extinguishing

Fire-hook and Fire-flat

Fire-hooks can be used for demolishing, shifting and removing an object. Fire-flat is for putting out fire at the source by beating with the flat repeatedly until the fire diminishes and stops. To make a fire-hook, a 2.5 feet long iron hook should be firmly tied to a 10-15 feet-long strong bamboo with couple wire. The width of the iron hook should be 6 to 6.5 inches.

To make a fire-flat, a dimension of 10 inches to 12 inches iron flat should be firmly fastened to a 10-15 feet-long strong bamboo with couple wire.



A fire hook and a fire flat

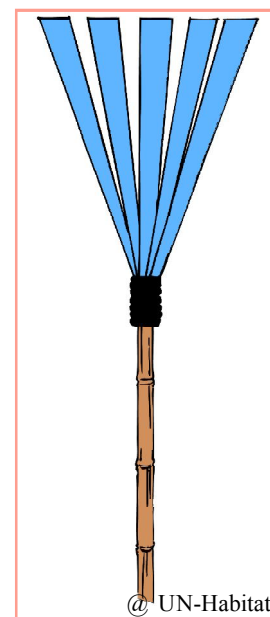
Gunny bags, buckets and sand buckets

A pile of sand, a tank of water, buckets and some gunny bags should be kept around the house for putting out a fire immediately.

Gunny bags, preferably soaked up with water, are to cover suddenly on the source of fire. Sand and water are also effective tools for putting out fire at the very first stage, before it spreads. Chopping hoes, pickaxes, shovels and rakes can also be used for fire-fighting.

Fire beater (Fire swatter)

It is a handy tool to fight fire. It can be made by tying at least five pieces of two-and-half feet-long, old PVC pipe with copper wire, by attaching nails or by grasping the baskets at the top of three and half feet long bamboo.



A fire beater
Source: FSD

Chapter 4

Safety Tips on Fire

4.1 Do's and Don'ts to prevent a fire

- Do not let children play with fire.
- Do not use lamps, candles, etc. near bamboo sheet/wooden partitions or mosquito nets.
- Do not pile hay or corn stems near houses.
- Do not use kerosene mixed with petrol for lighting or to start a fire.
- Do not smoke or use fire in paddy fields during the harvest time.
- Do not throw cigarettes carelessly in the forest while hunting or collecting fire wood.
- Do not store fuel and fuel oil near the fire place.
- Do not use lighter or candle light near fuel oil.
- Do not use mosquito coils, candles or fragrant sticks without trays.
- Do not use candles if no-one is around.
- Keep a person near the fire place when it is in use.
- Keep the house and campus compound clean and clear of debris and dry leaves.
- Douse cigarette butts with water before disposing of them.
- Keep a fire extinguisher, fire hook, fire flat, sand bucket, water bucket and ladder in every house.
- Keep a separate water tank for fire-extinguishing.

4.2 If fire breaks out in your community

- Inform the nearest fire brigade immediately.
- Put out fire by using readily available fire-fighting tools such as water or any other tools which may help to keep the fire under control and prevent it from spreading before the fire engine arrives.



Get help from neighbours as soon as you know fire breaks out.

- Direct the nearest route for fire engines to reach the fire burning area.
- Clear the way so that the fire engine can easily access the area.
- Spray water on the sparks to prevent the fire from spreading.
- Assist with putting out fire.
- Avoid unnecessary crowding in the area.

4.3 If fire breaks out at your house

- Don't panic. Be calm. Don't run away.
- Don't put out the fire secretly; ask others who are nearby for help.
- Inform the fire brigade immediately.
- Put out the fire with help from neighbours, the community members and firemen.

4.4 If your clothes catch on fire

- Do not run. The air will fan the flames and make them burn faster.
- Stop, drop and roll – continue until the fire is extinguished.

4.5 If you see another person on fire

- Wrap the person in a blanket, rug, drapery, towel or coat to smother the flame.
- If you have nothing to cover the person, grab them, drop them to the ground and roll them until the flames are smothered out.
- Try to remove the burned clothing but do not pull it over the head.
- If the clothing is stuck to the skin, do not put it off.
- Seek medical care immediately to treat the burns.

4.6 If your room is on a higher floor of a burning apartment/flat

- Do not jump out of the window.
- Try to use the emergency ladder, if possible. Follow the fire escape plan of your house.
- Never use the lift/elevator.

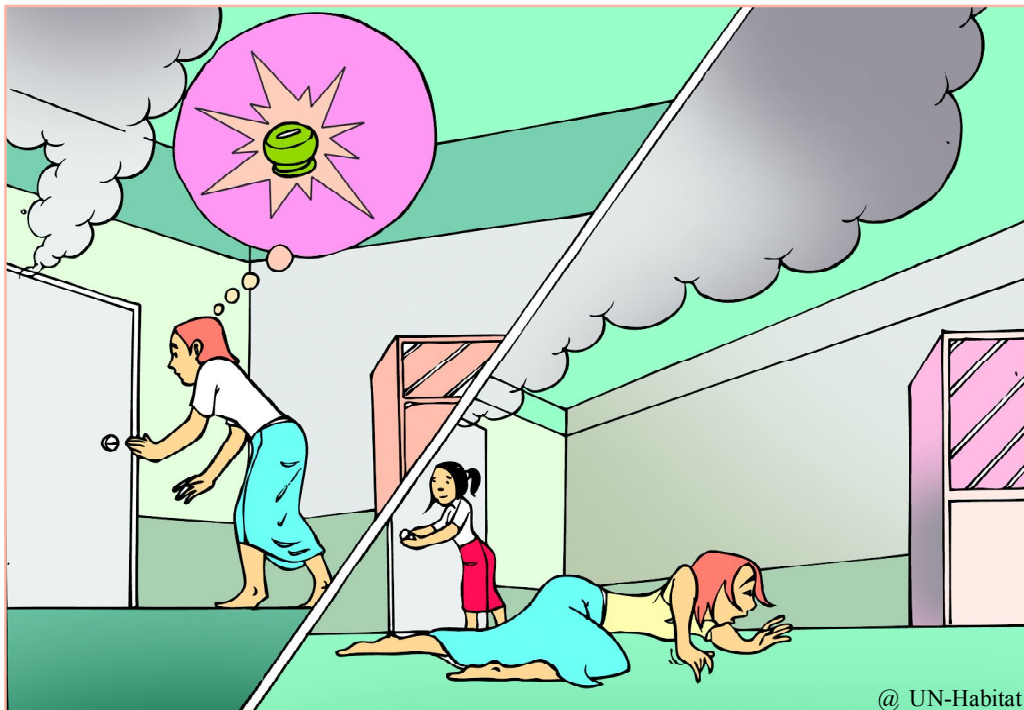
- Wave your hands and signal to rescuers using a light-coloured cloth from a window so that they can see you in the smoke.
- Be calm and wait until rescuers come to save you. Follow their instructions.

4.7 To escape from a room during a fire

- Check closed doors for heat before you open them. If you are escaping through a closed door, use the back of your hand to feel the top of the door, the door-knob, and the crack between the door and the door frame before you open it. Never use the palm of your hand or fingers to test for heat - burning those areas could impair your ability to escape a fire (i.e. ladders and crawling).

If the door is hot -

- Do not open it. Escape through a window. If you cannot escape, hang a white or light-coloured sheet outside the window, alerting fire-fighters to your presence.



Escaping from a room during a fire

If the door is not hot -

- Open it slowly and ensure that fire and/or smoke are not blocking your escape route.
- If your escape route is blocked, shut the door immediately and use an alternate escape route, such as a window.
- If the doorway is clear, leave immediately through the door and close it behind you.
- Be prepared to crawl. The air is clearer and cooler near the floor.
- Go to your family meeting place in front and away from your home to check that everyone has got out and to meet the fire department.
- Never go back into a burning building. Inform fire-fighters immediately if someone is left in the building.
- Once you are safely out, stay out. Do not re-enter.

4.8 After a fire

- If you detect heat or smoke when entering a damaged building, evacuate immediately.
- If you have a safe or strong box, do not try to open it. It can hold intense heat for several hours. If it is opened before the box has cooled, the contents could burst into flames.

Emergency Contact Numbers for Fire Services

Yangon/Mandalay Emergency	191
Fire Services Department	01-666912, 666913
Yangon Division Fire Brigade	01-252011, 252022
Nay Pyi Taw (Central Station)	067-420005, 420017
Mandalay (central Station)	02-60739

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The List of Organizations Contributed to the Development of this Manual

- Action Aid
- Arche Nova
- Asian Disaster Preparedness Center
- Care Myanmar
- Department of Educational Planning and Training
- Department of Meteorology and Hydrology
- Fire Services Department
- French Red Cross
- Information and Public Relation Department
- Maltesa International
- Metta Foundation
- Myanmar Engineering Society
- Myanmar Geosciences Society
- Myanmar Information Management Unit
- Myanmar Red Cross Society
- Pact Myanmar
- Relief and Resettlement Department
- Save the Children
- Tdh-Italy
- United Nations Development Programme (UNDP)
- United Nations Educational, Scientific and Cultural Organisation (UNESCO)
- United Nations High Commissioner for Refugees (UNHCR)
- United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)
- United Nations Office for Project Services (UNOPS)
- United Nations Population Fund (UNFPA)
- World Vision

MANUAL ON FIRE

Causes, Effects & Preparedness

Developed by UN-HABITAT, Myanmar

*For further information:
UN-HABITAT, Myanmar
No. 6, Natmauk Road
Tamwe Township, Yangon
Myanmar
desk@unhabitat-mya.org*