Ready4RescEU

TÜRKİYE ULUSAL AJANSI
TURKISH NATIONAL AGENCY

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“Ready4ResEU”

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ABBREVIATIONS

AB	European Union
AFAD	Disaster and Emergency Management Presidency
ASR1	Assessment, Search and Rescue
ASR2	Wide Area Assessment
ASR3	Sector Assessment
ASR4	Rapid Search and Rescue
ASR5	Full Search and Rescue
CONSTITUTIONAL COURT	Total Coverage Search and Recovery
CE	Conformité Européenne (European Conformity Mark)
HAZMAT	Hazardous material
INSARAG	International Search and Rescue Advisory Group
K9	Trained Search and Rescue Dog (usually used as a canine search unit)
CBRN	Chemical, Biological, Radiological and Nuclear
LEMA	Local Emergency Management Authority
OSOCC	On-Site Operations Coordination Center
Rcm	Rapid Clean Marking
UMKE	National Medical Rescue Team

INTRODUCTION

One of the important issues in disasters such as earthquakes, landslides or floods is the search and rescueactivities that take place during the response phase. Search and rescue activities are mainly carried out by public institutions such as AFAD, UMKE and professional first responders of accredited non-governmental organizations. In addition to these organizations, workers in the mining sector, civil works workers such as infrastructure and superstructure, and construction equipment operators are also actively involved in both search and rescue and logistics activities.

It is obvious that the experience of these occupational groups in search and rescue activities, which come to the forefront with their capabilities such as cave-in, entering the wreckage, debris removal, working in a gaseous environment and evacuation, which they are familiar with during the first intervention, is İmportant in disaster response and preparation.

However, problems such as lack of knowledge about structural collapse types, warning signs, fortification measures, risks and hazards after disasters, lack of habits of working together with professional search and rescue teams, lack of communication and coordination can hinder rescue operations and even increase the risk of loss of life of the teams.

The number of team members involved in search and rescue activities may be insufficient due to the high number of destroyed and damaged structures after disasters such as earthquakes that cause great destruction. In such cases, there is a need for teams and individuals who will directly contribute to search and rescue activities.

This training content aims to provide the skills of professional groups that can support professional search and rescue teams to assess affected structures, identify hazards, participate in search and rescue activities, apply safety measures to facilitate rescue operations effectively and safely, and work with responsible professional teams at the disaster site.

1 DEFINITIONS

Disaster: A natural, technological or human-induced event that causes physical, economic and social losses for the whole or certain segments of the society, halts or interrupts normal life and human activities, and the coping capacity of the affected society is not sufficient. A disaster is not the event itself, but its consequences.

Emergency: Any situation or circumstance requiring urgency and of a scale that is major, but generally manageable by local means. In Law No. 5902, it is defined as the events that stop or interrupt the normal life and activities of the whole or certain segments of the society and require urgent intervention and the crisis situation created by these events.

Capacity: The ability of a society, organization or system to resist, cope with, mitigate the effects of, respond to and recover from disasters.

Hazard: A physical event or phenomenon arising from nature, technology or human beings that threatens life by occurring at a certain time or geography, and has the potential to harm the socioeconomic order and activities of the society, natural environment, natural, historical and cultural resources. In other words, hazard refers to all events originating from nature, technology or human beings that may cause physical, economic and social losses.

Risk: The probability of loss of life, property, economic and environmental values that an event may cause under certain conditions and environments. In other words; "risk = potential losses" or "risk = hazard x vulnerability".

Vulnerability: A measure of the physical, social, economic or environmental damage and loss that people and their living environment may suffer in the face of hazards of different types and magnitudes. In some publications, it is referred to by terms such as vulnerability, fragility, sensitivity.

Operational Concepts

Search In disasters and emergencies, it is called all the work done to locate the disaster victim or casualty. Search is defined as looking for a person who is lost or has not returned. The search may include searching in a building or in a square kilometer area. Search requires training and skills in search techniques and theory.

Rescue: In disasters and emergencies, taking the injured or life-threatened victim who cannot escape on his/her own to a safe place from where he/she is located.

Coordination Center: It is the center where large search and rescue operations are managed. It is usually used in larger scale disasters and coordinates all aspects of the operation.

1 DEFINITIONS

Definitions Related to

Team What is a Team?
It is a group of people who come together for a specific purpose in line with common interests and values.

What is a Search and Rescue Team?
In disasters and emergencies, the team that carries out all the work carried out to determine the location of the victim and the work carried out to transfer the victim to a safe place from where the victim is located is called the search and rescue team.

2 COMMUNICATION AND COORDINATION

2.1 COMMUNICATION IN DISASTERS AND EMERGENCIES

During the response phase, which can be described as the most difficult period of the disaster, many people, institutions and organizations from different disciplines participate in the activities being carried out. Fulfillment of the activities to be carried out in harmony, fast, effective and efficient will be possible only if all stakeholders participating in the response activities have a simple, flexible and applicable communication and coordination system. The most important point in communication is that information transfer is two-way. If the information transfer is one-way, it is called "information"; if it is two-way, it is called "communication".

Especially in the disaster response phase, the most commonly used type of communication among the employees in the field is "face-to-face meeting". In units where disaster response activities are managed centrally and have a more hierarchical structure, coordination between upper/lower and equal level units is one of the types of communication in order to prevent any disruption in the activities carried out especially in the emergency response phase.

Common principles of successful communication, the importance of which once again emerges in crises and disasters;

- That the communicators know the services to be provided in disaster operations,
- It should have an institutional capacity.

In doing so, the main principles are to be motivated, organized, transparent to stakeholders, ensure the accuracy of the information, and transfer the information to other stakeholders at the right time in the right way.

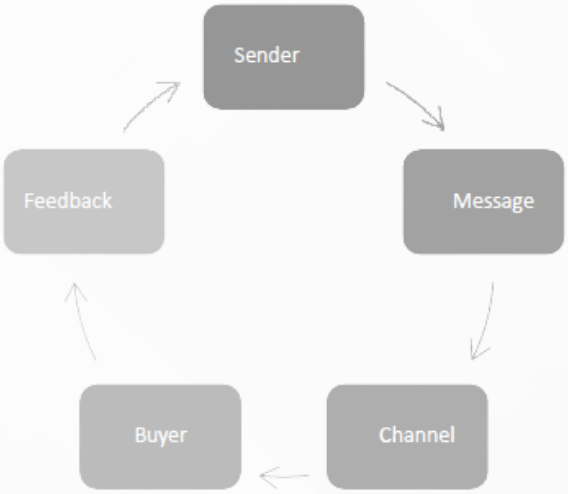


Figure 1:
Communication Process and its Elements

The most important issue to be considered at this stage is to convey the information needed about the disaster tothe parties in need in the shortest time, in the most effective and simple way, in the most accurate way and with the most accurate content, and to ensure that the results reach the points in need. In addition, for healthy communication; being natural, staying calm, accepting the event and being respectful to other stakeholders with whom one is in communication, empathizing by taking into consideration the psychological conditions of disaster victims and other affected people, being consistent in the exchange of information, being reassuring to those with whom one communicates, not being judgmental to the receivers or transmitters of the messages, being open, conveying the truth in the correct language are of vital importance.

2 COMMUNICATION AND COORDINATION

Communication Problems in Disasters and Emergencies

The most vital component of disaster and crisis management is undoubtedly communication. In disasters or emergencies, while the employees make efforts to realize the activities as soon as possible, problems arise due to time, disaster victims, public opinion, media, etc. and incomplete or insufficient information shared among the disaster workers:

- In case there is no road m a p on how communication will be ensured, employees working in the disaster area do not know what to do and in which order, or do not have the will to do it It interrupts the work to be done in the first moment of communication.

- The lack of a common terminology, which is one of the main reasons for accurate and healthy communication, is another reason that prevents communication between stakeholders involved in the work.

- Written communication tools, i.e. messages, which are used for employees to be aware of all activities carried out or to be carried out with each other, with other institutions, organizations and interested parties. The lack of standardization of the materials to be used such as forms, information forms, disaster reports, etc. hinders communication.

Communication barriers in disasters and emergencies can be listed as follows:

- Psychosocial Factors (Anxiety, Panic, Stress and Social Interactions)
- Chaos and Uncertainty
- Time Pressure
- Physical Conditions (Noise, Space Limitations, Inadequate Equipment)
- Ruptures in Infrastructure and Communication Channels
- Coordination Deficiencies
- Language and Cultural Differences

Highlights of Communication in Disasters

- Speed Disasters are a race against time; communication must be just as fast.
- Accuracy: False information causes chaos and undermines trust.
- Simplicity: Messages need to be uncomplicated and easy for everyone to understand.
- Adaptability: Communication should be planned to fit the crisis environment and stakeholders.

2 COMMUNICATION AND COORDINATION

Speed, accuracy, simplicity and compatibility are the keys to success in disaster management. Using these features together and in the right way is very important for minimizing the effects of the disaster, informing the public and dealing with the crisis quickly.

In disaster situations, using the right communication techniques plays a critical role in understanding the needs of affected individuals and contributing to their recovery.

2.1 COMMUNICATION IN DISASTERS AND EMERGENCIES

Coordination refers to a systematic connection and coordination between the work and activities of a large number of institutions, organizations and individuals who want to achieve a common goal. Coordination is the harmony and cooperation among individuals to achieve the targeted success in the field.
In the coordination established among those involved in services for disasters, the aim is to accelerate the processes among stakeholders in order to minimize disaster damages. What is realized at this stage.

When we look at the type of coordination; it is essential to share the available information, that is, to know who is where and what they are doing, among those who work in the intervention phase in order to manage information. This process is the coordination steps realized for managing information, preventing disinformation and accelerating the processes.

In addition to this, effective and efficient use of resources in the field in harmony in order to realize the common goal among the people and teams who land on the field effectively and rapidly in disasters can be evaluated within the framework of "response coordination".

Coordination Process

- With the occurrence of the disaster, all the tools, individuals, groups, institutions that provide communication in the emergency process and those who will be involved in the event, all the tools, individuals, groups, institutions to realize their common goals in advance Informing those who will take part in the determined procedure and process is the pre-coordination communication process.
-
- Ensuring the coordination of the activities to be carried out to realize the common goal in the intervention process in harmony with other stakeholders is the coordination phase.
-
- Finally, the common goal of all activities carried out during the intervention phase is to save human life and to continue the services needed. process is the control phase.

2 COMMUNICATION AND COORDINATION

The following coordination principles should be considered while responding to disasters:

- In case of any possible disaster or emergency, it is necessary to ensure that those working in the field do not cause any disruption in the communication and coordination among themselves and with the disaster management center. communicating and informing relevant stakeholders of changing situations in a timely manner,

- Each team working in the field should work in harmony with itself and with other stakeholders, share information with other teams in the field and work together for the functioning of collective work groups to be established,

- It is important that the activities in the field are carried out regularly with the disaster management center.

Coordination Problems in Disasters and Emergencies

There are some obstacles in ensuring effective coordination in disasters. Presence of many teams with different structures, working rules and methods in the field during the intervention phase prevents communication, coordination and joint works. This leads to misunderstanding of the activities of other organizations and even competition between different organizations.

In addition, effective response to disasters cannot be ensured due to the fact that the institutions related to disaster response at local, national or international scale and the people in charge in the disaster area do not know how to establish connection with each other or are not aware of each other. Therefore, the absence or low level of coordination and cooperation leads to task duplication.

RECOMMENDATIONS

The response phase, which is one of the most important phases of the disaster management system, contains many areas that can easily cause any vulnerability to emerge. In this framework, a good The execution of the response system depends on the disaster-stricken country having a significant disaster preparedness, planning and response capacity as well as managing this capacity through effective communication and coordination.

Volunteers who want to take part in the disaster area should apply to the AFAD/Crisis center in their province before going to the disaster area. Likewise, private, non-governmental or official institutions that will take part in the field should also notify the AFAD/Crisis center in the province where they are located that they will take part in the field.

2 COMMUNICATION AND COORDINATION

Volunteers and institutions arriving at the disaster area should apply to the AFAD/Crisis center established in the disaster area and work in coordination before going directly to the disaster area. Likewise, AFAD/Crisis center should be notified when leaving the duty station.

Considering the situation of not being able to communicate with mobile phones due to the problems of damaging the base stations in the disaster area, it is important to take alternative communication tools such as radios as much as possible.

In order to have a good communication in the disaster area, the message sender and the message receiver should use a common terminology, focus on a common goal and share it correctly with other employees. It is important that the messages transmitted should be clear, concise, concrete, accurate, consistent, complete and courteous in order to make significant contributions to the intervention activities.

While working in the disaster area, the instructions of the official authorities should be followed and unannounced and uncoordinated actions to take responsibility should be avoided.

In case of a disaster, coordination of many different institutions from a single center can prevent the problems in communication and coordination in response activities. Since many different institutions and persons are involved in the incident, the possibility of making mistakes will be high. During the communication and coordination stages, the decisions and instructions to be given by the crisis center from a single window should be complied with.

It is important to manage rumors and misinformation in a disaster area, including monitoring and managing rumors and misinformation that can cause community division and conflict. It is important to recognize that conflicting information, values and priorities between individuals, communities and organizations can also create tensions. Engaging with local community leaders can uncover these rumors and misinformation early during a disaster so that they can be managed appropriately.

Care should be taken when communicating with disaster survivors at the disaster site, using reassuring language, but not making promises that may not materialize. Traumatized persons should not be forced not to speak.

It is necessary to be flexible in terms of communication, taking into account changes in disaster survivor needs or stakeholder expectations. Disaster survivor needs and stakeholder expectations will often change. It is therefore important to monitor emerging needs and expectations and adapt elements to reflect changes in the situation. For example, new needs, issues and expectations of disaster victims may mean that key messages, communication methods and distribution channels need to be changed.

2 COMMUNICATION AND COORDINATION

It is important to take an "empathetic" approach at the disaster site. The process of putting oneself in the other person's shoes, looking at things from their point of view, accurately understanding, feeling and communicating their feelings and thoughts is called "empathy".
Empathy is a critical skill to understand and support the emotional state of individuals experiencing a disaster. An empathetic approach not only puts the person at ease emotionally, but also contributes to more efficient and faster rescue and recovery efforts in the field. People When they feel safe, they are more open to the assistance process and more willing to cooperate with team members.

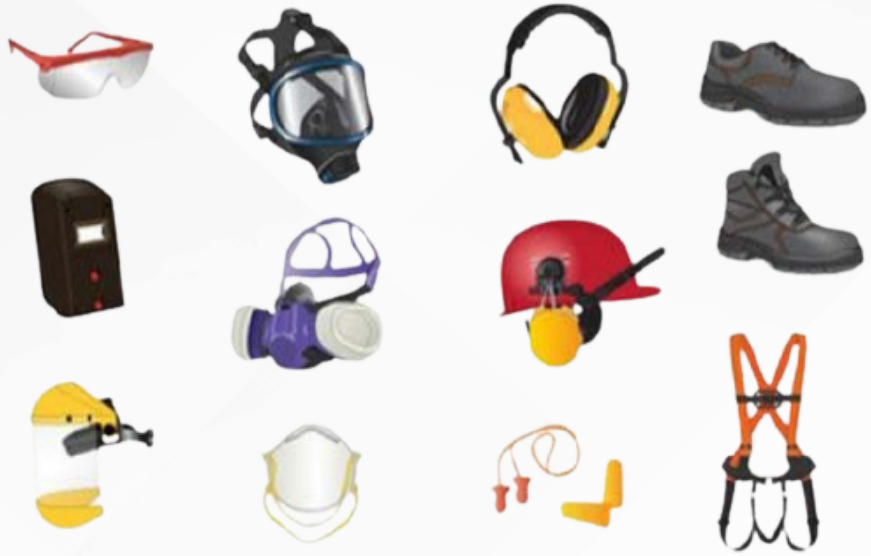
When working with other teams at the disaster site, clear and precise language should be used and timely and accurate information flow should be ensured. Briefings or activity reports should be submitted to the AFAD/Crisis center at regular intervals about the activities carried out.

PRACTICAL COMMUNICATION LANGUAGE DURING DISASTER AND CRISIS

- Use clear and precise language.
- Make eye contact and maintain a calm and open posture.
- Use gestures and facial expressions for confirmation.
- Ask open-ended questions to maintain communication.
- Empathize, respect their feelings, be patient.
- Take care to use the I language.
- Avoid judgmental, critical attitudes and discourses.
- Do not rush to speak.
- Do not think about what you will say while listening.
- Do not try to offer a solution quickly.
- Control your emotions.
- Make sure you choose the right time and place.
- Use a calm tone of voice in times of crisis.
- Include affirming statements in your conversations.
- Rephrase what is being said in your own words.
- Sometimes just listen quietly.

3 PERSONAL PROTECTIVE EQUIPMENT

It refers to all tools, instruments, equipment and devices designed for this purpose, which are worn, fitted or held by the employee and which protect the employee against one or more risks arising from the work carried out and affecting health and safety.



Search and rescue activities in debris pose a high risk to personnel.

- Search and rescue personnel should never enter the work area without personal protective equipment, taking into account the dangers while working in the rubble.
- CE marking refers to the EU declaration of conformity and must be present on each personal protective equipment.

Work Uniform:

- Uniform for all team personnel,
- Suitable for seasonal conditions, breathable, waterproof,
- Resistant to friction and abrasion during debris rescue operations,
- It should be in a structure that does not hinder mobility during work.

Hard hat:

- It will protect the head from any danger in the debris field,
- It has an under-chin strap that connects under the ear, preventing it from coming off the head,
- Adjustable according to head circumference,
- It must have a helmet lamp that will allow personnel to work in the debris field.

Protective Goggles:

- It should be in a structure that will prevent the dust and particles from damaging the eyes during working with crusher, piercing and cutting rescue materials in the debris.

3 PERSONAL PROTECTIVE EQUIPMENT

Dust Mask:

• It is used to protect against particles that may damage the respiratory tract during work in the debris field.

• Disposable masks should be replaced within the specified period and masks should not be lowered below the chin and used.

Knee pads and elbow pads:

• Knee and elbow pads, the inner part of the soft sponge, the outer part must be resistant to friction and impacts on hard ground.

• It should prevent injuries that may occur in the knee and elbow area during long-term work in places where personnel have to work crouching in the debris.

Gloves

• Facilitating the use of rescue equipment during work in debris,

• Does not reduce the grip of the hand,

• Providing cut resistance in contact with rubble,

• Heat-protected gloves must be worn by personnel when in contact with hot metals.

Headphones

• Protective materials on the helmet or in the form of plugs to protect the ear health of the personnel during the use of noisy equipment.

Full Body Safety Harness:

• It is used to secure the personnel from a fixed point against falling and slipping during working in debris.

Work Shoes:

• Impacts and bumps that may occur while working in debris

• Slip and falls

• Penetrating piercing objects

• It has an antistatic sole and should have a structure that protects against sprains with its ankle-hugging structure.

4 SAFETY AND SECURITY

4.1 Safety

Safety is the state of being free from a situation that could cause injury, harm or death.

4.2 Safety

It refers to the execution of the legal order in social life without disruption and the state of people being able to live without danger.
Safety means protection against dangers, security means protection against threats. While safety events happen by accident, security events are intentional.

Security in Search and Rescue is grouped under the following main headings.

1- Staff safety
2- Crime scene security
3- Vehicle and equipment safety
4- Victim safety
5- Campsite security

1) Personnel Safety:
In order for the personnel to work safely and securely, they are provided with occupational safety trainings in order to prevent occupational accidents and they are ensured to use personal protective equipment.

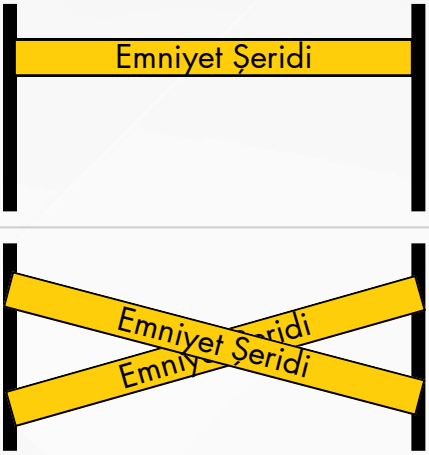
- Security plans are created according to the disaster area.
- Medical controls of the personnel are continuously monitored.
- It is ensured that team personnel work in a paired system.
- Meteorological and environmental factors are monitored.
- Personnel are responsible for their own safety and security and that of their team members.
- Personal Protective Equipment must be used.

Note: *Seat belts must be used when working deep and high in the debris.*

2) Incident Scene Safety:

- Incident area information is taken.
- Detection work is carried out against hazardous materials.
- Work area safety is ensured.
- Adequate lighting is provided for the safety of work areas.
- It is ensured that the entry of vehicles, teams and persons who do not have a duty at the scene is prevented.

4 SAFETY AND SECURITY



Çalışma Alanı

Tehlikeli Bölge

3) Vehicle and Equipment Safety:

- Vehicles and equipment must be used in accordance with the instructions for use.
- All vehicles and equipment must be kept within the safety lane.
- A fire extinguisher must be kept next to the equipment working with fuel oil.
- Vehicle keys must not be left on the vehicle in the work area.
-

4) Casualty safety:

Taking necessary precautions against the risks that may occur during the rescue activity of the accident victims whose location is determined;

- The place where the victim is located is supported if necessary, necessary precautions are taken against other possible risks.
- Necessary medical support is provided to the victim.

5) Campsite Safety:

- A suitable area should be selected by considering climatic conditions and environmental factors.:
- The designated area should be sufficiently illuminated and a backup power supply should be available.
- Sanitary conditions must be provided for the team during the mission.
- Communication equipment must be kept active and in working condition.
- Resting areas for search dogs should be determined.
- Measures must be taken against possible fire risks.
- Entrances and exits to and from the camp must be continuously controlled and recorded on a 24-hour basis.
- 24-hour security personnel should be assigned to appropriate areas.
- It should be ensured that the personnel are informed against sabotage and looting incidents that may come from outside and that security measures are taken from local authorities.
- Ensure that personnel and equipment are free of harmful substances before leaving the scene
- and when entering the campsite.

4.3 Evacuation and Evacuation

Plans What is Evacuation?

According to the definition in the Annotated Glossary of Disaster Management Terms, evacuation is the process of evacuating structures or an area that needs to be evacuated within the scope of disaster and emergency and civil protection services in a fast and orderly manner using predetermined routes and transferring people and living things to safe places.

According to another definition, evacuation;

It is the evacuation of part or all of the incident area as previously planned due to internal or external effects in extraordinary situations, disasters and emergencies and the transfer of people to planned safe areas.

Work Area Evacuation Procedure

- A safe area for the gathering area where the working team members can escape in case of possible danger and an alternative second area are determined by taking into account the dangers.
- The routes through which all team members working in the work area can evacuate quickly and safely in case of danger are determined and kept open.
- When necessary, emergency evacuation routes are made clear with phosphorus spray paint or safety tape.
- All team members are informed about evacuation routes and gathering areas.
- All team members are informed if the emergency evacuation routes change due to aftershocks, fire, etc.
- All vehicles are parked in a safe area in the direction of escape for fast and safe evacuation in case of danger.
- When necessary, evacuation is carried out quickly without panic.

4 SAFETY AND SECURITY

Evacuation Procedure from Operation Area

- In order for the operation area to recover quickly after the emergency evacuation decision, all team officials/responsible persons in the area must work in coordination.
- Unless otherwise stated by the Team Leader, all materials and equipment in the Operation and Work
- Area are loaded onto vehicles.
- During the collection of materials and equipment, it is done as fast as possible and safety precautions can never be neglected.
- Materials and equipment are loaded into vehicles under the responsibility of the Logistics Team Manager and by a team member assigned by him/her by checking the "Equipment-Material Checklist".
- "Packing and Loading Procedure" may be ignored according to the urgency while loading materials and equipment into vehicles.
- After the personnel, equipment/materials and vehicles in all areas to be evacuated are ready, action is taken on the evacuation route notified by the Disaster Area Crisis Center Officer.
- The team leaves the disaster area after obtaining "Permission to Leave the Duty Station" for team members and all vehicles from the Provincial Disaster Center after reaching the safe area after emergency evacuation.

Situations Requiring Evacuation

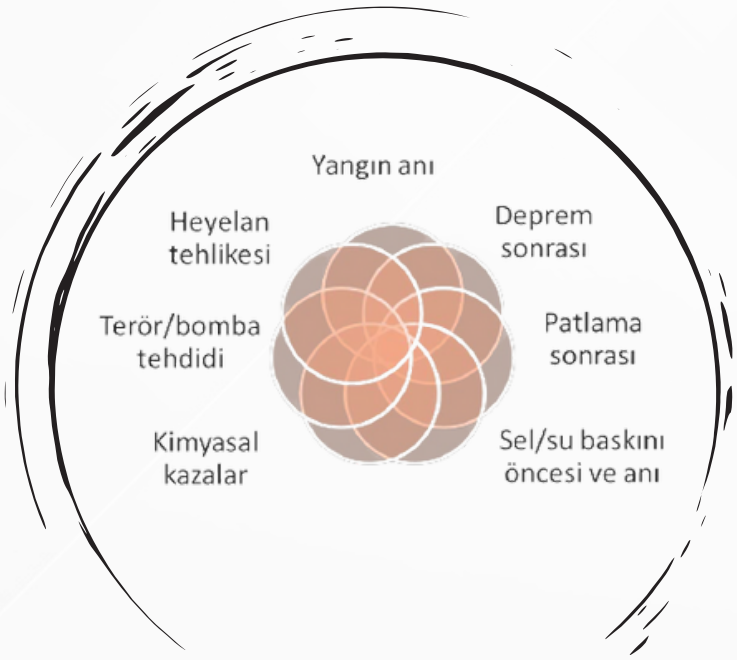


Figure 2 - Situations Requiring Evacuation

5 EMERGENCY SIGNAL SYSTEM

EVACUATE THE SITE: 3 short signals of 1 sec each

In some cases, situations that may pose a danger to personnel may occur in the work area. In such cases, a warning is given by the safety officer or the personnel realizing the danger in order to warn the other team personnel as follows. The personnel who receive this warning shall immediately leave the area and go to the predetermined safe gathering area.

STOP OPERATIONS, BE QUIET: 1 long signal for 3 seconds

The team may be asked to suspend work in cases where other teams are making audible or device searches or when a dangerous behavior is observed. The personnel who receive this warning stops all working devices, interrupts the work and waits quietly where they are.

CONTINUE THE OPERATION: 3 sec long and 1 sec short signal

The following warning is given for the team to continue its work when the listening work carried out by other teams ends or the dangerous situation in the wreckage ends. Personnel who receive this warning continue their work from where they left off.

- Signals continue until all teams working in the field fulfill the requirements of the signal.
- All personnel must be informed about emergency signals before entering the site.
- If more than one team is working at the same site, all teams should be informed about the signals and a common understanding should be developed.

ASR ASSESSMENT SEARCH AND RESCUE

Level 1: Wide Area Assessment / Wide area exploration (ASR 1) Determining the scope of the disaster and identifying the resources that will be needed in the incident area.
Level 2: Sector Assessment (ASR 2) Dividing the scene into small zones, evaluating these zones and determining the priority areas.
Level 3: Rapid Search and Rescue (ASR 3) Rescue of victims who can be easily rescued in the first hours of the incident (Search and rescue operations to be completed in maximum 12 hours).
Level 4: Full Search and Rescue (ASR 4) Operations requiring professional search and rescue teams and equipment (search and rescue operations to be completed in more than 12 hours)
Level 5: Total Coverage Search and Recovery (ASR 5) The end of the crisis situation in search and rescue operations and the phase of removal of debris where rescue operations are completed.

5 EMERGENCY SIGNAL SYSTEM

5.1 Marking System

The marking system is a method used to show the operation status and to share information etween teams and field personnel.
It also strengthens coordination and prevents duplication of work. There are 3 ways of application of the marking system to achieve the defined objectives:

- Workspace marking
- Casualty marking
- Quick Clean (Area cleaning) marking

5.1.1 Workspace Marking

- Marking should be done during the Level 2 sector assessment if the area is assessed as a work area.
- It should be on the front facade or at the entrance to the area.
- Dimensions should be around 1.2m x 1.0m.
- Preferably spray painted and in a conspicuous color.
- In the box; Work area name, Team name, ASR level performed and date
- Outside the box; the hazardous substance status at the top and the triage category at the bottom.
- The work area name should be approximately 40 cm and the team name should be approximately 10 cm in size.
- When all operations have ended in the area, a horizontal line should be drawn through the center of the box to indicate the end of all operations in this work area.

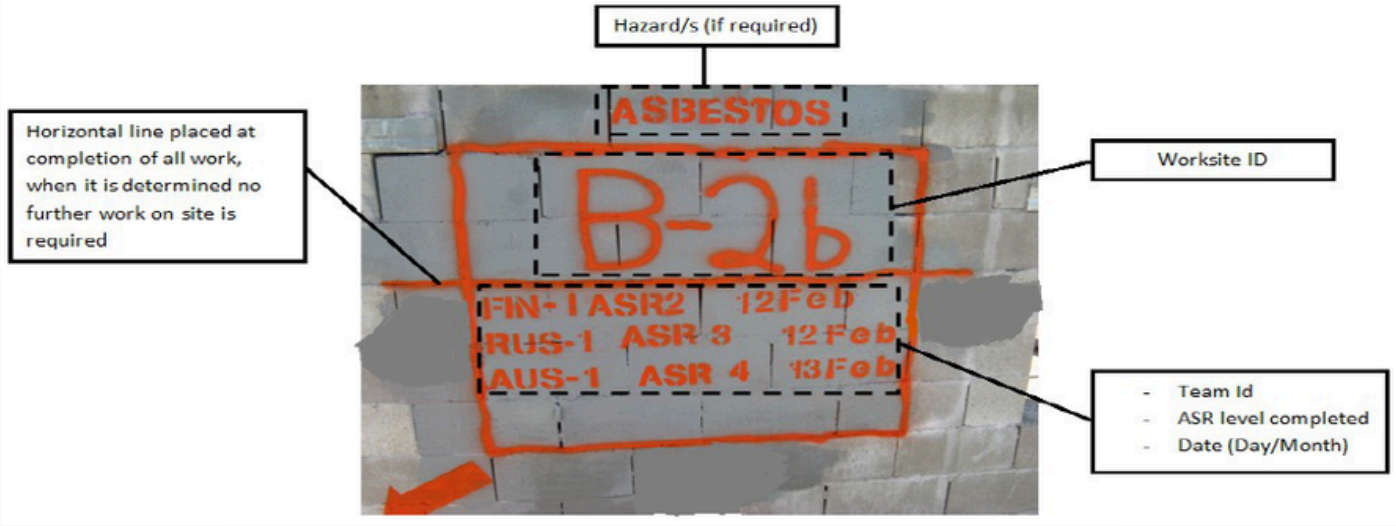


Figure 3 - Building Marking

5 EMERGENCY SIGNAL SYSTEM

5.1.2 Casualty Marking

- Casualty marking is used to indicate the location of dead or injured casualties in locations that are not clearly visible to rescuers.
- The marking should be made in an area close to where the casualty is or is thought to be.
- The letter "V", approximately 50 cm in size, should be spray-painted in a color contrasting with the ground.

Objective: To show the location and position of survivors in the wreckage.

5.1.3 Rapid Clean Space Marking (Rcm)

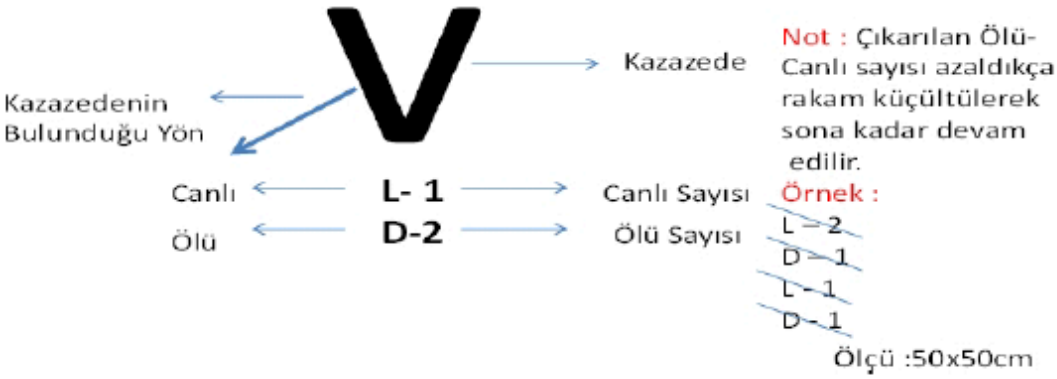
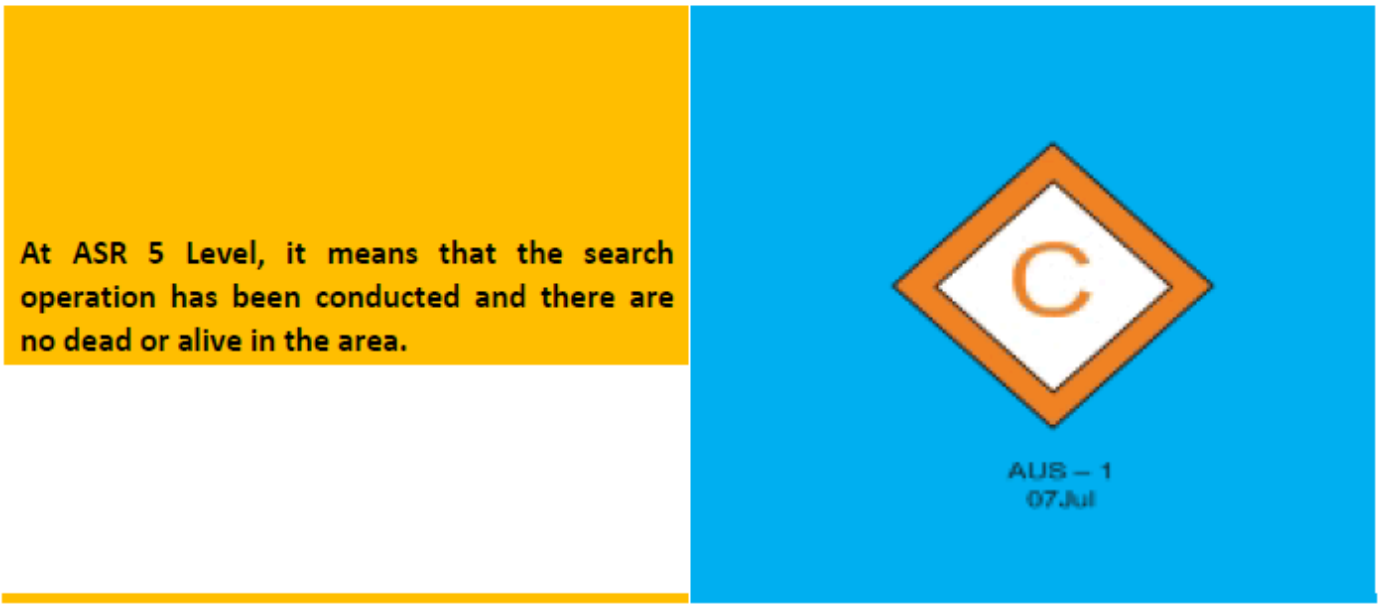


Figure 4 - Casualty Marking



5 EMERGENCY SIGNAL SYSTEM

5.2 Internal Sectoring

- In in-building sectorization, the floor is divided into quarters.
- The quadrants are named alphabetically clockwise starting from the front facade.

Sector E is used to sector the lobby, elevator or stairwells located in the middle of the buildings.

Figure 5 - In-Structure Sectorization

6 TEAM FORMATION

Team members should be sensitive to the needs of the team, team members should be willing to cooperate with each other and work together in all team activities by sharing what they know or can do. Above all, for effective communication to exist, team members need to respect and trust each other. The team should act in a hierarchical structure.

Let us not forget! For the Search and Rescue Team to work effectively;

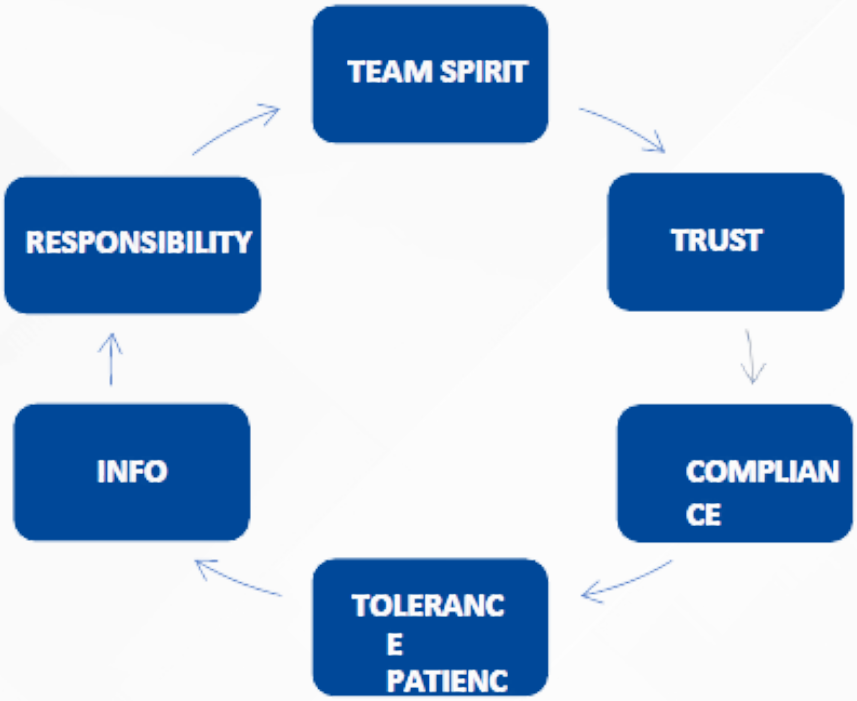


Figure 6 - Effective Working Principles of the Team

Duties of the Personnel in the Team

T**eam Leader**: Ensures that the teams working in the operation area fulfill their duties and coordination. He/she is responsible to the area management authority and is in constant contact. Reports the reports received to the area management authority. Transmits instructions from the center to team supervisors.

Deputy Team Leader: Ensures the tasks and follow-up of the teams working in the operation area. He/she is responsible to the team leader, transmits the instructions from the team leader to the Group leaders in the field. Transmits reports from Group leaders in the field to the team leader.

Security Officer: Responsible for the team's transportation to and from the scene and the security of the campsite.

Doctor: Responsible for the health of the team personnel.

6 TEAM FORMATION

Medical: Makes the first intervention against possible injuries during the work of the team personnel in the field and performs the first medical intervention to the accident victim reached.
Veterinarian (If there is a search dog in the team): Responsible for the health and care of the search dogs in the team.
Civil Engineer: Determines building styles and structural risks.
Logistics: Ensures the determination and provision of the team's needs such as vehicles, materials, food, shelter, cleaning, etc.
Team Leader: Responsible for the management of the team, evaluation of the scene, determining the rescue technique, ensuring record keeping, making task changes among the team members when necessary, marking the scene and informing the group leader about the termination of the operation.
Rescue Personnel: Applies the rescue method deemed appropriate by the team to the victims whose locations are determined in the debris according to the building's construction style, collapse type. Using various rescue materials needed reach and rescue the victim under the rubble. They take necessary precautions against the risks to themselves and the debris during the rescue work.
Communication Personnel: Ensures communication with Disaster and Emergency Management Center and other
teams.
Hazmat Personnel: Determines whether there is any hazardous material in the working area.
Sling and Tie Down Personnel: Performs lifting and pulling of large masses in the working area and fixing the masses likely to fall.

Example Light Level Search and Rescue Team Organization Chart:

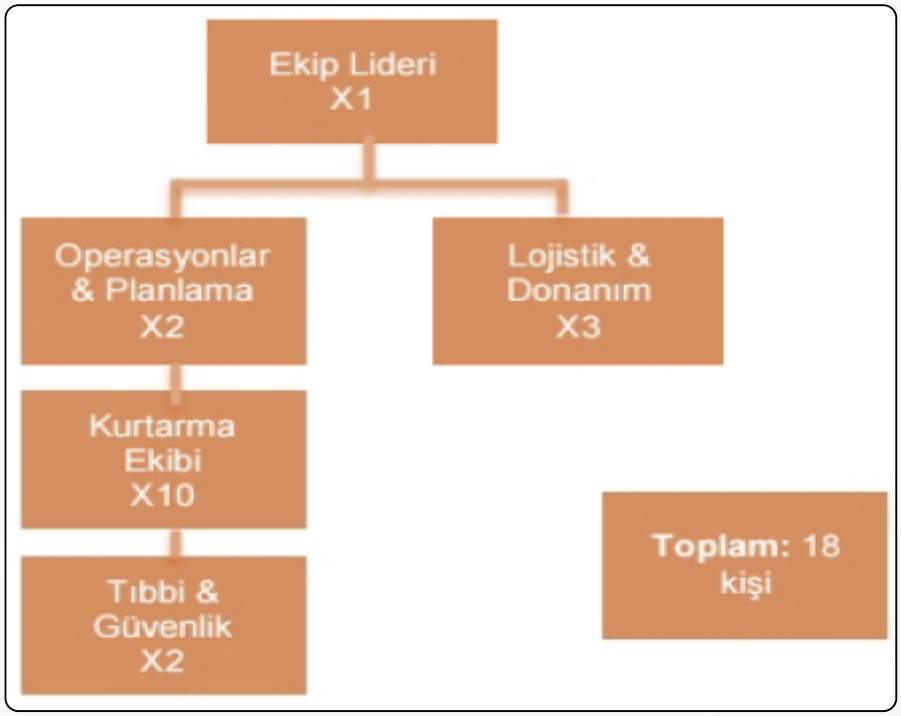


Figure 7 - Light Level Search and Rescue Team Organization Chart

7 RESCUE TOOLS AND MATERIALS USED

7.1 Rescue Tools

Mobile CBRN Decontamination Centers provide decontamination of masses, environment, vehicles, victims, responders, personnel and equipment from chemical, biological, radiological and nuclear agents. They are mobile centers that can be set up at any point while living beings and objects exposed to agents are taken to safe areas.

The centers include a trailer or container, fixed water tank, personnel, clothing, equipment and vehicle decontamination units, 30 KVA generator, waste water and suction pump, cleaning agent tank, hose winding reel, fire first response system, A, B, C and D type protective clothing and under vehicle decontamination apparatus.

CBRN Response Vehicles take part in the first response to Chemical, Biological, Radiological, Nuclear (CBRN) agents.

Transportation Vehicles are used for collective transportation of experts working in disaster management to the disaster and emergency area.

Communication and Image Transfer Vehicles can be equipped with alternative communication methods and camera systems that can broadcast live via satellite. It can transfer voice, data and images from the field to the emergency center and provide communication. These vehicles have the capacity to provide communication and image transmission from all points of the world to any specified point without the need for any other equipment.

Mobile Coordination Centers function as an emergency center that can move in the region where the disaster and emergency occurs. It serves as a field office where coordination is ensured in the management of the incident.

Mobile centers can have facilities such as system room, office area (operation room), kitchen, shower and toilet. Desktop work can be done with the modular office area inside. In the office area, computers, servers, printers and LED screens allow working as a team.

7 RESCUE TOOLS AND MATERIALS USED

Compact Operation Vehicles are designed to respond to relatively small-scale emergencies that affect individuals rather than the masses. These 4x4 traction vehicles function as a minimal mobile search and rescue station with basic search and rescue equipment in their chassis.
With their weight advantage and high acceleration capability, they are more efficient in urban search and rescue and operations in open terrain. It provides speed and flexibility of movement to the specialized team in limited operations such as finding missing persons and micro rescue operations in urban areas.

Heavy Tonnage Search and Rescue Vehicles are designed to respond to largescale disasters and emergencies. It can accommodate the materials, equipment and equipment that at least 2 search and rescue teams can work at the same time. The 6x6 traction vehicles have a carrying capacity of 28 tons and a towing capacity of 8.5 tons. The vehicles can illuminate the work area with the 80,000 lumen light tower on the vehicle and the light tower can rotate 360 degrees. 13.6 kW generator system provides a significant amount of electrical energy. can produce. Thanks to the integrated crane system, the vehicles can lift weights of up to 2.6 tons.

Medium Tonnage Search and Rescue Vehicles can carry different types of fullfledged rescue equipment and have a 4x4 traction system. These vehicles take over in situations that light tonnage vehicles cannot handle. The speciallydesigned body contains equipment such as hydraulic and charged cutting and splitting tools, generators, concrete breakers, multi-purpose cutters, audio and video search devices, lifting pads and lighting sets. The vehicles are supported by lighting poles that can be raised above the bodywork and a crane in front. Double cabin With its seating area, it also makes it possible for personnel to arrive at the scene at the same time

Light tonnage search and rescue vehicles have a 4x4 traction system. They have systems such as a 5.5-ton towing winch, vehicle radio, navigation device, reversing camera and telescopic lighting.
The car bodies of the vehicles contain all the equipment required to save lives in a light-tonnage search and rescue vehicle.

Amphibious Search and Rescue Vehicles can easily navigate through swamps, shallow waters, rough and sloping terrain with no roads, heavy snow and debris. In this way, it saves lives in disasters such as floods, floods, avalanches, landslides, fires and earthquakes. It can climb 50-degree steep slopes and navigate 45-degree side slopes. With 35 liters of gasoline, it can perform search and rescue operations for 8 hours continuously. The vehicles have the capacity to carry 6 personnel on land and 4 personnel in water, and can carry 3 personnel when a stretcher is placed.

7 RESCUE TOOLS AND MATERIALS USED

7.2 Search and Rescue Supplies

Helmet		Helmets made of fiber-plastic materials are indispensable for search and rescue operations. It prevents vital risks by protecting from blows to the head.
Head Torch		It is worn on the helmet during debris operations. The reason why it is on the head is to ensure that the rescuer can see where he is looking. Also, being on the head is an advantage in terms of keeping hands free.
Goggles		Protects eyes from dust
Dust mask		It has two functions. Since the odor increases in the later days of the earthquake, vicks cream is applied inside and menthol reduces the smell. Of course, preventing dust from entering the lungs is another advantage.
Knee brace		Sudden movements during debris operations can sometimes cause a lot of damage to the limbs. Knees are also the most frequently hit by debris. Knee pads protect the knees from sudden impacts.
Steel Tipped Boots		Steel-tipped boots have an important place in search and rescue operations due to their durability and resistance.
Flasher		It is used to locate the injured person who is trying to be rescued in the dark. Flashing also indicates the working area.
Glove		Its use is essential to prevent damage to the hands during work.

7 RESCUE TOOLS AND MATERIALS USED

Delsar

It is a highly sensitive listening device that allows contacting and locating living beings under the rubble during rescue operations.

Searchcam

In places where video can be taken, the wall is drilled and a heat-sensitive camera is inserted and a video call is made.

Concrete and iron cutting saw

It is a breaker-driller machine used for breaking and drilling concrete, marble, stone floors and blocks or breaking and drilling walls in disasters, collapsed buildings, live rescue operations, and for digging holes and tunnels. It has pointed tips for drilling and flat flat tips of various widths for breaking. They are available with air, electric and hydraulic power. They are mostly used in narrow spaces

Concrete and iron cutting saw

It is used for cutting boards when necessary during rescue work, but mainly for cutting trees or boards to make fortifications.

Concrete Crushers

It is the most commonly used material in earthquake rescue operations. There are many types from 27 kg to lighter ones. It is a breaker-driller machine used for breaking and drilling concrete, marble, stone floors and blocks in collapsed buildings, in live rescue operations, or for breaking and drilling walls, and for digging holes and tunnels. It has sharp tips for drilling and various widths and flat tips for breaking. They are available with air, electric and hydraulic power. They are mostly used in narrow spaces.

7 RESCUE TOOLS AND MATERIALS USED

Cordless Breaker and Drill

Used for smaller breaking or drilling jobs in confined spaces.

Cutting set

Used for cutting metal (plastic, wood, etc.) in rescue operations in collapsed structures in traffic accidents and earthquakes. There are light and heavy duty types working with hydraulic and air pressure. Can be used horizontally and vertically. Cutting edges are made of hardened steel.

Separation Set

They are used in traffic accidents, earthquakes, deformed vehicles and collapsed structures to rescue trapped living beings by separating, lifting, compressing and pulling. The most useful ones are hydraulically powered.

Generator

They are the energy sources of earthquake search and rescue operations. It has a wide range of uses from debris work to lighting the camp. Usually 5-10 KW is used.

Air Compressor

Electric and fuel oil types are available. 225 bar- 310 air compression capacity. Gasoline is used in fuel types. The fresh air cylinder can be filled.

Air Cushions

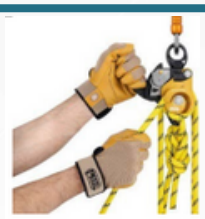
Airbags are the most ideal material for creating or stabilizing suitable positions by lifting weights after clearing the obstacles with appropriate tools to reach the injured person, lifting vehicles, airplanes, trucks and heavy construction machinery in traffic accidents, separating blocks from each other, buffering holes and cavities. They are flat, cubic, cylindrical, balloon-shaped and of various sizes.

Projectors

They are the light sources of earthquake rama rescue operations and have a power of 250, 500, 1000 watts. When working, it should be fixed by mounting on a stand. The height of the stand can be up to four meters at most. They should never be touched when hot and their bulbs should not be touched. The projector stand can rise up to 4 meters.

7 RESCUE TOOLS AND MATERIALS USED

Reel System



It is used for descending from a high place during search and rescue operations, transporting the injured from one place to another by air, and transporting cargo.

Cutting set

It is an important material that both the rescuer and the rescued should use in all rescue operations.

Technical equipment

There are many technical materials available, including static and dynamic ropes, different types of carabiners, octuplets, various types of perlon. These are essential in a search and rescue team.

Spoon stretcher

It is a practical stretcher that makes it easier to take a wounded person on a stretcher because it has two parts.

Light Search and Rescue Equipment

Tools such as pickaxes, shovels, hammers, sledgehammers, axes, lever, saws can be used practically in light search and rescue operations.

Reciproc ating Saw

Facilitates the cutting of metal, wood, brick, stainless steel and studded metal in debris.

Extension Cable

It is a type of apparatus that allows electric current to be delivered to more distant places. The extension cable also multiplies the plug channels, allowing several electronic devices to be connected to a single socket.

Shelter and Logistics Ten

In Disasters fast Setup Possibility of by providing emergency shelter and logistics needs can be met.

7 RESCUE TOOLS AND MATERIALS USED

Hydraulic Jack

Hydraulic jacks have a fast and effective use in lifting very heavy loads. In traffic accidents, fixing, space opening, separation works and under the wreckage It has an effective use in lifting loads with fulcrum work in search and rescue activities.

Iron Cutting Shears

Hand tools specially designed for cutting iron bars, sheets and other metal materials of different thicknesses and sizes.

Spiral Cutter

The rapidly rotating cutting stones are used to cut and shape the product easily and in a short time. It cuts all hard-to-cut products such as iron, sheet metal, stone, hard wood in a short time.

Fire Extinguisher

A fire extinguisher is an active fire protection device used to extinguish or control small fires, usually in emergency situations.

8 LOGISTICS AND TRANSPORTATION

8.1 Logistics

Logistics: The provision of resources such as products, services and people where and when they are needed. It is difficult to achieve success in any operation without logistical support.

Logistics Preparations

- Preparation of tents to be used by the staff.
- Preparation of camping equipment to be used by the personnel.
- Preparation of foodstuffs and drinking water (3 liters per day) prepared in accordance with calorie calculations (4500 calories per day) to be sufficient for the personnel during the operation.
- Preparation of relevant checklists.
- Identifying a suitable area suitable for development, setting up tents and establishing a camping area.

- Preparation of equipment such as radios, satellite phones, faxes, etc. with spares in order to put them into service without interrupting the operation.
- Preparation of technical materials and spare parts required for the repair and maintenance of all equipment and materials to be used in the operation.

8 LOGISTICS AND TRANSPORTATION

- Preparation of information such as duty sheets of transportation vehicles, materials suitable for seasonal conditions, license plates, weights and measures of vehicles.

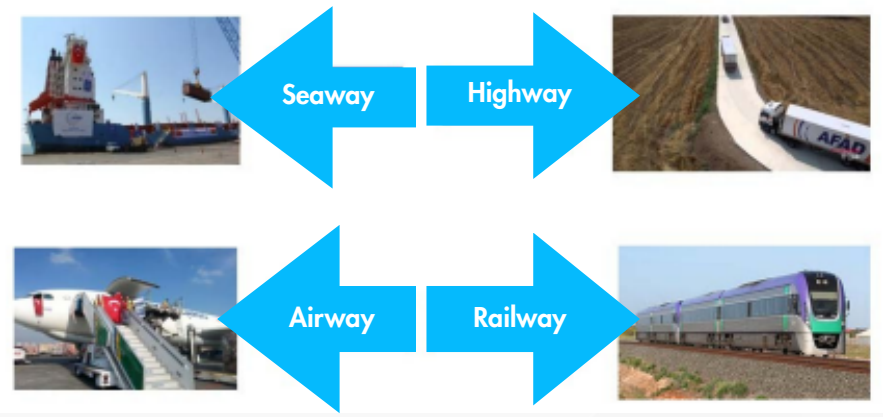
Search and Rescue Personnel Sample Personal Equipment and Supplies Checklist

SERIES NO.	TYPE OF MATERIAL	VAR	NO
1	Technical Dress		
2	Technical Suit Replacement		
3	Hard hat		
4	Hard Hat Lamp		
5	Helmet Lamp spare battery and bulb		
6	Work Goggles		
7	Protective Gloves		
8	Sterile Gloves		
9	Phosphorescent Vest		
10	Knee and Elbow Guards etc.		
11	Whistle, Dust Mask, Earphone, Meter, etc.		

8.2 Handover

Dispatch: In short is the activity of moving from one place to another another place , changing place. Search and rescue teams are dispatched to the disaster area by using different means of transportation in the safest way with vehicles and equipment within the scope of pre-determined deployment plans according to the type of disaster and the geographical region where it occurred.

Types of Inheritance



8 LOGISTICS AND TRANSPORTATION

Matters to be Considered Before and During the Transfer

- Loading, transportation and return plans should be prepared according to the type of transportation.

- Documents such as the vehicle's license, insurance policy, medical examination, etc. must be prepared.
- Before the start of the departure, the fuel status should be checked and the places where fuel can be obtained on the road route should be determined, and if not available, spare fuel should be provided.
- It should be determined in advance where it is safe to stay during breaks and accommodation on the road route.
- It should be determined by which vehicle the personnel will be deployed.
- The radio system of each vehicle must be checked before deployment and communication must be ensured on the specified frequency.
- For overseas assignments, the necessary documents for each vehicle must be prepared in advance.
- Road conditions, weather conditions, infrastructure, looting, civil disturbances, criminal incidents, prohibited areas, control procedures, protection vehicle procedures and alternative road routes etc. should be informed in advance.
- Depending on the nature of the Disaster and Emergency situation, sufficient team personnel, materials, tools, equipment, food and shelter needs should be provided.
- Transportation must be done safely by maintaining the vehicle following distance within the speed limits.
- After each break and accommodation, roll call system must be applied and control must be ensured.
- For domestic missions, you must first register at the Disaster and Emergency Management Center, and for international missions, you must register at the Reception Center (RDC).

9 CLEANLINESS AND HYGIENE

Disasters such as earthquakes, floods and fires, which cause environmental destruction and great destruction, cause serious pollution of air and water resources. Garbage and rubble wastes generated after disasters also cause environmental and hygiene problems if no precautions are taken or proper disposal methods are not applied.

Hygiene problems and environmental pollution in the disaster area pave the way for bacterial outbreaks such as diarrhea and leptospirosis. The increase in vector breeding areas after flood disasters can lead to an increase in diseases transmitted by this route. With the lack of sufficient water and lack of personal hygiene in the disaster area, the risk of person-to-person contact and airborne diseases increases. Damage to infrastructures such as electricity, water and sewage increases the risk of water and food-borne diseases. The most common problems are lack of access to healthy, sufficient amount of drinking and utility water and inability to dispose of wastes properly.

The effects of disasters and emergencies can be evaluated in three periods:

- First period: Outbreaks of infectious diseases are not expected during the impact phase (0-4 days).
- Second period: In the post-impact period (4 days to 4 weeks), infectious disease outbreaks may occur, especially from pathogens endemic to the region.
- Third period: During the recovery period after four weeks, diseases with a long incubation period can be a problem.

Control and Precautions Against Environmental and Hygiene Problems:

In case of any emergency and disaster, it is essential to make a planning in advance by making evaluations to identify, evaluate, regulate, control and prevent the factors in the environment that have the possibility of adversely affecting human health, the existence of other living things, future generations and other living things. Compliance with personal hygiene habits is very important in the prevention of many infectious diseases.

- Adequate clean water storage.
- Maintenance of water mains and transmission lines as soon as possible.
- Use disinfection and sterilization methods and tools such as soap, detergent and bleach.
- Hand washing with soap and water is protective against diseases that can be transmitted through the fecal-oral route. Alternatively, alcohol-based hand antiseptics can be used. However, in case of visible contamination, hand antiseptics should not be used and hand washing should be preferred.

Use of chlorine tablets or solutions for clean water supply:

Both emergency tools and healthy drinking and potable water can be disinfected with bleach or chlorine tablets.

Disinfection with 0.5% Chlorine Solution:

Put one part 0.5% bleach and nine parts water (boiled and cooled for 20 minutes) into a disinfected plastic bucket. Dishwashing gloves are put on the hands and tools washed with soap or detergent are placed in chlorinated water and left for 20 minutes. Then they are passed through boiled and cooled water in a disinfected container and left to dry. They are stored in a clean and dry environment or in a closed disinfected container.

Disinfection of water:

If boiling facilities are available, water should be boiled for at least one minute. Residual chlorine in tanks and tanks should be 0, 3-0, 5 mg/liter. Chlorine should be checked at the middle and end of the water supply and water transmission system. When a decrease in chlorine activity is detected, the cause should be found and eliminated.

9 CLEANLINESS AND HYGIENE

Chlorination:

A teaspoon of 5% bleach is added to 20 liters of water and left for 30 minutes. If there is a chlorine tablet (4 mg), add it to 1 liter of water, if the chlorine tablet is 160 mg, add it to 40 liters of water. When using chlorine or any other disinfectant, the instructions for use must be taken into consideration.

Solar (Sunlight) Disinfection of Water:

It is an effective method that can be used if no disinfectant is available. It is based on the principle of inactivating pathogens in water with ultraviolet in the sun's rays. Clean plastic bottles of water are placed in a sunny place and left in sunlight during the day. This water can be used until clean water assistance arrives.

- In emergencies, a trench or latrine should be set up for 50-100 people in the newly established camp area, and then improved to one cabin for 20 people. Field-type latrines are the most appropriate.
- Locate waste collection facilities at distant points from shelter areas: Garbage collection in the disaster area should be organized quickly and garbage should be collected regularly because garbage is a breeding ground for vermin and rodents that can carry infectious diseases.
- Garbage dumping areas should be established at appropriate points in the places where disaster victims are sheltered. These areas should be disinfected daily with lime cream, chlorine solution, bleach, etc. In the fight against houseflies, the tops of the environments such as garbage and manure where the creature will lay eggs should not be open (If there is no suitable garbage bin, garbage and manure piles can be covered with 20 centimeters thick soil).
- Contrary to popular belief, bodies that cannot be removed immediately after a disaster do not pose an epidemic risk to survivors. However, personnel are at risk of diseases such as tuberculosis after airborne contact, hepatitis B and/or C, human immunodeficiency virus (HIV) after blood contact, cholera, shigellosis, hepatitis A, rotavirus diarrhea after fecal contact. Workers should wear protective barriers (gloves, impermeable boots, aprons) and masks for airborne pathogens.

It is important to prepare for emergencies and disasters in advance. When environmental and personal hygiene is ensured, epidemic-scale diseases can be prevented.

10 WORK MACHINERY

Agriculture, industry, public works, national defense, etc. Construction machinery used by state institutions and the private sector are motor vehicles *that produce work and services, do not carry people, animals and cargo on highways and are equipped with special equipment suitable for the job.* There are multi-purpose construction equipment used in construction works such as superstructure, infrastructure, highway construction, maintenance and repair, construction of water structures, soil excavation, loading and spreading, etc.

Types of Construction Machinery

Construction machines are generally divided into two as crawler and tire machines. Apart from this, it is also possible to classify construction machines according to the areas in which they are used. There are very special construction machines developed for special jobs.

10 WORK MACHINERY

The Most Commonly Used Work Machines in Debris Intervention:

Loaders (Loaders)

This type of machine is used for loading work. The loader consists of a tractor and a bucket part that provides loading in front. The bucket part is moved by hydraulic systems.

Backhoe Loaders (Backhoe Loaders)

The difference of a backhoe-loder from a loder is that it is also a backhoe. It is both a backhoe and a loader. A tractor consists of a bucket at the front for loading and a backhoe at the rear. The bucket and backhoe are moved by hydraulic systems.

Excavators

The lower part is crawler, rubber tire or truck chassis. The upper part is equipped with a drive motor and control system. In the front part of the machine, there is a mechanism that provides digging. There are types such as bucket, flat bucket, reverse bucket, grapple, draglin bucket. It has crawler or rubber wheels. Crawler types are more powerful than rubber ones. Wheeled excavators are more flexible and mobile. As with other types, the bottom of the digger plate has a blade that can be replaced as it wears out. It is a flexible construction machine that can perform work below or above its own level.

Graders

Graders are multi-purpose machines generally used for leveling works, ditch digging and road construction. They are also used for leveling and cambering, mixing and spreading, piling material on its side, as well as for light scraping, provided they are used properly.

Dozers

They are work machines used in excavation, filling, splitting, pulling and pushing operations. There is a suitable blade assembly under the machine. Dozers have different blade lengths and can be used in various jobs. Dozers are generally heavy and powerful construction equipment.

Forklifts

A forklift is a type of construction machinery used to lift heavy loads by means of its forks and to load or stack them, especially on a vehicle or shelf. Forklifts are mostly used for carrying, lifting and placing/stacking weights on pallets. There are types with diesel, gasoline and LPG engines for use in open areas and types that can operate with AC and DC electric current in closed areas.

Mobile Cranes

A mobile crane is a crane mounted on crawler carriers or rubber-tired carriers, or a hydraulic crane operating as telescopic cylinder or selfpropelled models mounted on truck-type carriers.

11 BUILDING TYPES AND COLLAPSE PATTERNS

Structure

Facilities constructed in accordance with various materials and construction methods to meet certain needs are called structures. The most important elements of buildings are carriers. Carriers differ according to building types

11.1 Building Types

The building types used today are as follows:

1.Wooden Structures

- Wooden structures are the most earthquake resistant structures compared to other structures.
- The carriers of wooden structures consist of uprights, beams, struts and fasteners that connect them together as a system

2. Reinforced Concrete Structures

- The structural elements of reinforced concrete structures consist of columns, beams and shear walls.
- If the columns and beams are not damaged, the building is not severely damaged.
- Although it is the most common type of structure in the world, it is the type of structure that causes the most loss of life in earthquakes.

11 BUILDING TYPES AND COLLAPSE PATTERNS

3. Steel Structures

- Steel structures are less common today than reinforced concrete structures.
- The main load-bearing elements such as columns and beams are steel.
- It is the most earthquake-resistant building type after wooden structures.


4. Masonry Structures

- They are structures built by laying materials such as stone and brick with or without mortar.
- Masonry structures are structures without columns and beams. Carrier elements are walls.
- For this reason, they are earthquake-resistant structures.


5. Adobe Buildings

- Adobe is a building material made of a mixture of mud, straw, grass and thatch poured into molds and made in the size and shape of bricks.
- Adobe buildings are not a frequently encountered building type today.
- It is generally a rare structure in rural areas. • It is not earthquake resistant.
- Adobe is a building material made of a mixture of mud, straw, grass and thatch poured into molds and made in the size and shape of bricks.
- Adobe buildings are not a frequently encountered building type today.
- It is generally a rare structure in rural areas. • Not earthquake resistant


11 BUILDING TYPES AND COLLAPSE PATTERNS

TYPES OF DAMAGE

Light Damage

- No structural damage.

Safety in Intervention:Easy to enter and exit and work for long periods of time. Priority in Response: These are the buildings that first responders can take care of first and quickly.

Medium Damage

- There is partial structural damage. Some column and beam concrete fractures are observed. The building is standing.

Safety in Intervention: Behavior is not obvious in aftershocks. Care should be taken when entering and exiting and long work should not be done.

Priority in Intervention: These are the buildings that first responders should take care of second and fast after the lightly damaged ones.

Heavy Damage

- The structural damage rate is high. The concrete and rebar of the columns and beams were severely damaged in the form of separation, rupture and bending. Mostly such buildings are unstable.

Safety in Intervention: Aftershocks or spontaneous collapse may occur. It is extremely dangerous to enter and exit. Long work cannot be done.

Priority in Intervention: These are the damages that first responders should intervene last. Victims can be taken from easy places close to the outside quickly and safely with few interventionists. First of all, professional teams should be notified and left to them.

11.2 Collapse Formations Seen in Buildings

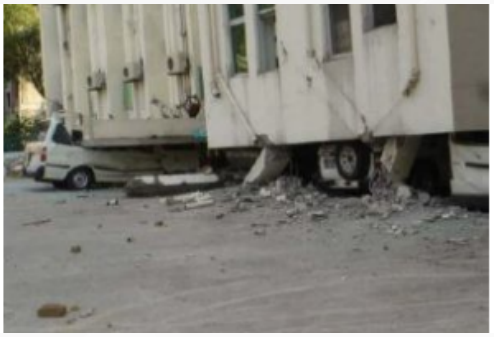
Partial Collapse

When debris masses are supported on one side and collapse on the other side and break in one piece, this is called Partial Debris

11 BUILDING TYPES AND COLLAPSE PATTERNS

Ground Floor Collapse

Mostly in 3-4 storey buildings, only floor debris is formed due to weak column beam connections.

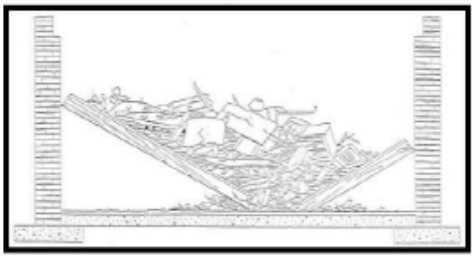


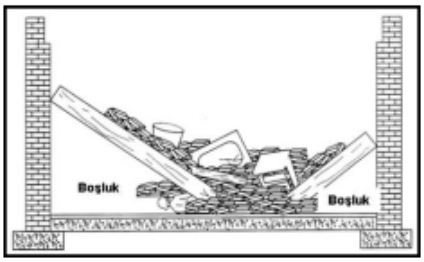
Mezzanine Floor Collapse

It is a form of debris that occurs if the wrong technique, missing material is used on one of the intermediate floors during the construction of the building.

V-Form Collapse Type

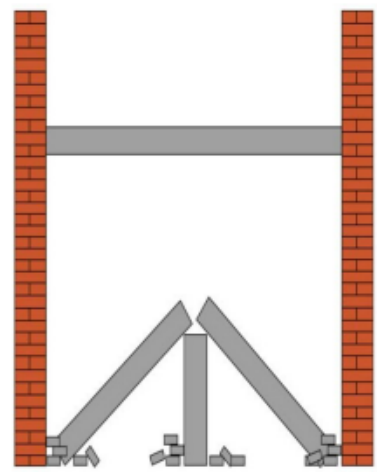
Debris can reach down to the ground floor or basement. It can also be referred to as vacuum collapse.

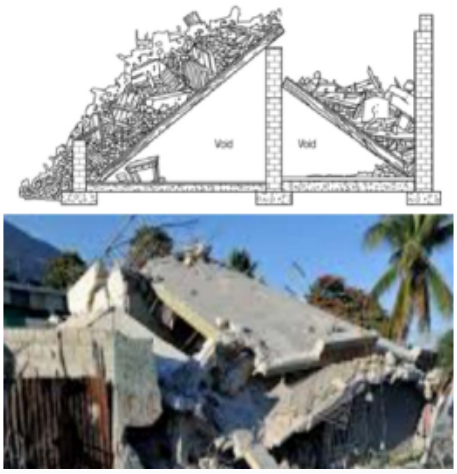




11 BUILDING TYPES AND COLLAPSE PATTERNS

A-Form Type of Collapse





Tipping

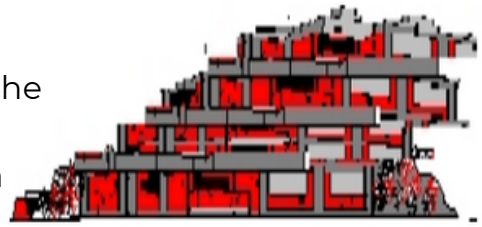
It usually o c c u r s due to reasons such as soil liquefaction and inappropriate construction of the building foundation to the ground

Press Shaped Debris This type of collapses are the collapses seen as a result of the floors collapsing on each other as a block in line with the strength coming from outside.

11 BUILDING TYPES AND COLLAPSE PATTERNS

Staircase Shaped Debris

This type of collapses are the collapses seen as a result of the external strength collapsing the structure in the form of a ladder in one direction.



Twisted Press Debris This type of collapse occurs when the structure collapses in the form of an auger as a result of the impact of the incoming strength on the structure from all directions.

Relationship between structure type and collapse

- Masonry: Tends to break and collapse in blocks. High probability of compression due to lack of stiffness and flexibility.
- Reinforced concrete: may collapse in a "pancake" shape or show severe cracks in columns and beams. Poorly designed structures may fail at the connections of structural elements.
- Steel structures: They usually deform before collapsing, allowing some time for evacuation. However, exposure to fire or corrosion can weaken the strength of the material.
- Adobe and wood: Extremely vulnerable to total collapse due to the fragility of the material and lack of adequate structural reinforcement. They are common in rural areas and carry a high risk of human entrapment.

Factors affecting collapse

- Intensity and type of seismic movement.
- Quality of construction and materials.
- Unauthorized structural changes.
- Age and maintenance of the structure.
- Ground conditions and foundations.
- Structural design and load distribution.

12 DEBRIS HAZARDS AND RISKS

Search and rescue teams in debris fields can be exposed to various risks. These risks are related to the complex and dangerous conditions caused by the debris.
Depending on the type of debris, the work to be done and the hazards to be encountered may vary (military, hospital, industrial, etc.).

Operational Risks in Debris:

Operational risks area major concern for search and rescue teams. It can affect both the safety of the teams and the health of the people to be rescued.

Debris Hazards and Risks

Structural Risks: Collapsed or collapsing structures in the debris field pose a risk of collapsing or tipping over on search and rescue teams. This can increase the risk of physical injury or death to teams.

Flammable and Explosive Substances: Fuel or chemicals leaking from collapsed buildings may pose a risk of fire or explosion.

Electrical Hazards: Debris sites often contain power lines, electrical panels and other electrical hazards. Such hazards can lead to the risk of electric shock and fire.

12 DEBRIS HAZARDS AND RISKS

Sharp and Pointed Objects: Debris sites can be full of sharp pieces of metal, broken glass and other sharp objects. Such objects may cause injury.

Toxic Gases

Air Pollution

Inadequate Lighting

Hidden Hazards: It can be difficult to locate people and objects under debris. This can increase the risk of accidentally harming people or objects.

12 DEBRIS HAZARDS AND RISKS

Psychological Stress

- Acute or chronic pain in various parts of the body,
- Weakness, fatigue,
- Depressed mood, anxious mood,
- Feeling short of breath, palpitations,
- Sleep problems
- Dizziness, instability

Unstable Floors: Debris sites are places where the ground can be unstable and slippery. This can increase the risk of falling.

Hidden Dangers: Structures used for purposes other than their intended purpose (production facilities under the stairs, illegal electricity, etc.).

∫ Contact with disaster victims in the debris field. Unhygienic working area.

Obstructions and Narrow Passages: It is common to encounter narrow passages and obstructions during debris operations. This can make it difficult for rescue teams to move forward and can lead to people becoming trapped.

To manage operational risks, it is important that teams are well trained, strictly follow safety protocols and maintain communication. Effective leadership and management are also required to coordinate operations and deal with emergencies.

In-Debris Risks	Non-Debris Risks	Operational Risks
• Structural risks • Sharp and pointed objects • Structural electrical hazard • Flammable and combustible materials • Unstable floors • Toxic gases	• Climate conditions • Polluted air • Inadequate lighting • Uncontrolled crowd	• Psychological stress • Compression and decompression • Hidden dangers • Blockages and narrow passages

12 DEBRIS HAZARDS AND RISKS

INCREASING DANGER SIGNS IN A COLLAPSED STRUCTURE

Signs of imminent collapse

❖ Diagonal and "X" cracks in load-bearing walls indicating excessive shear stresses.
❖ Separation between walls and ceilings, indicating a dangerous structural disconnection.
❖ Visible bowing of the structure, which may indicate progressi v e failure of the foundation or vertical elements.
❖ Deformations of beams and columns, especially if they buckle, indicating that they are exceeding their load limits.
❖ Unusual sounds, such as cracking or popping, can be a warning of impending failure of materials.
❖ The collapse of floors or ceilings is a sign that the internal structural system has collapsed. Additional risks in a collapsed structure
❖ Falling debris and unstable structural parts.
❖ Risk of fire due to gas leaks and burst pipes.
❖ Risk of secondary collapse while trying to gain access inside.

13 DEBRIS HAZARDS AND RISKS

Crime Scene Management

In disasters and emergencies; it is the emergency response management carried out within the framework of plans and rules in order to use resources effectively and efficiently.

According to Law No. 5902, in Disaster and Emergency Situations;

Ensuring coordination among institutions and organizations and producing and implementing policies on these issues are **under the Disaster and Emergency Management Presidency of the** Ministry of Interior (**AFAD**).

The following points should be considered in incident scene management; ·

- Determining the Type of Incident
- Prevention of Secondary Hazards
- Protection of Property
- Utilizing Available Resources Effectively
- Mitigating and Managing Losses

What information about the crime scene is needed?

✓ What is the incident? When did it happen?
✓ Is it ongoing?
✓ Is there a risk of a secondary incident?
✓ What are our capabilities and capabilities?
✓ What is the area identity and transportation routes?
✓ Is the number of people affected known?
✓ Evacuation status of the area?
✓ Is the logistical support needed available?

13 DEBRIS HAZARDS AND RISKS

In operational aspects, attention should be paid to the following;

❖ Confirmation of accurate and complete information from the ECC (Disaster Management Center) in the incident area,
❖ Ensuring communication between teams and institutions,
❖ Ensuring environmental and employee safety,
❖ Planning the work to be done and identifying the necessary needs,
❖ Continuation of the work at the scene without interruption,
❖ Recording all the work done and providing feedback.

First team to reach the area;

✓ Carries out crime scene management in coordination with AFAD.
✓ Evaluates the incident.
✓ Performs scene triage.
✓ Sectors the incident scene.
✓ Creates security circles.
✓ Selects the location of the Incident Command Center.
✓ Ensures safety by contacting law enforcement officers.

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✓ Ensures safety by contacting law enforcement officers.

Keeping records is essential for sound crime scene management;

Registrations

o Disaster Survivor Registration Form
o Crime Scene Triage Record Form
o Crime Scene Intervention Record Form
o Crime Scene Ambulance Dispatch Form
o Valuables Registration Form
o Team Change Form
o Task Termination Form

13 DEBRIS HAZARDS AND RISKS

Behavioral Principles of Personnel at the Incident Scene

- The Search and Rescue Team evaluates the situation in the light of the information obtained during the search and rescue activities and determines how the rescue activities will be carried out.
- In the meantime, the external guidance of incompetent individuals should not be listened to.
- The behavior of Search and Rescue Teams deployed to a disaster-stricken country or region for Search and Rescue operations primarily concerns their organization and their country.
- Search and Rescue Team members should never forget that they are ambassadors of their country, their team and AFAD organization in a broad sense.
- Care should always be taken to be positive.
- Ethical values, including moral, legal, cultural values, traditions and human rights, should be taken into account in the relationship between Search and Rescue teams and the affected country.
- Search and Rescue Teams going on international missions should be self-sufficient in every sense and should not in any way place additional burdens on countries already heavily burdened by disasters. should not be.
- When working in the debris, personnel must wear the standard clothing, dress, helmet, gloves, goggles, etc. specified for the debris.
- Mutual in speeches Sun goggles attachment in communication problems This should be avoided unless there are health reasons for doing so.
- Team leaders should rest the team members from time to time.
- The disaster victim s h o u l d b e g i v e n brief information about the course of the work in a reassuring and consistent approach without specifying time and duration. In addition, they should be clear about the situation without tiring the disaster victim. information should be sought.

Considerations to be taken into account

- Communication problems due to language differences
- Differences in work ethics and values
- Various local costumes
- Local customs regarding food and etiquette
- How local laws are applied
- Local living conditions and driving habits

13 DEBRIS HAZARDS AND RISKS

- Local policies on the use of various treatments or medications need to be respected.
- Alcohol, drug and tobacco use.
- Transmission of sensitive information.
- Use of search dogs.
- Treatment and transfer procedures for the dead or wounded.
- Dress and standards.

- Gender restrictions according to culture and region should be taken into account.
- Restrictions on forms of entertainment and recreation should be considered.
- Local communications and restrictions on their use should be known in advance.
- Local procedures for taking or showing photographs of survivors or structures should be known and acted upon accordingly.
- Collecting gifts / mementos (building parts, etc.)
- Damage to property due to debris marking etc. should be avoided.

13 DEBRIS HAZARDS AND RISKS

- Care should be taken when entering restricted/prohibited areas (religious, military, etc.).
- Act in accordance with the changing conditions according to political situations.
- Behaviors and events that may cause stressful situations should be avoided.
- Smoking, joking, arguing and talking loudly at random places and times should be avoided.

- There should be absolutely no discussion with the personnel and relatives of disaster victims at the debris site,
- When a live/dead casualty is reached, the team supervisor should be signaled.
- Psychological support should be provided to the team before, during and after the mission.

- Personnel must be vaccinated against possible diseases and injuries.
- Since vaccines differ according to countries in overseas assignments, the vaccination procedures of the country to be visited should be known in advance and should be followed up with the vaccination card to be obtained from the Ministry of Health, General Directorate of Health for Borders and Coasts.

14 FIELD ENTRY PROCESS TECHNIQUES AND INFORMATION COLLECTION

Field Entry Process:

1- Coordinate acquisition/address finalization.
2- Visual inspection by the Structural Engineer to assess the type of construction, current collapse pattern, possible collapse patterns and risks.
3- HAZMAT control (if there is a hazard, the OSOCC is contacted through the Team Leader and the hazard is requested to be eliminated).
4- If the area is considered suitable as a working area;

- While the safety lane is drawn on the one hand, the possible gathering area, determination of the escape zone from the debris area (away from the debris area and the 2nd safe zone selected for escape from the area in case of danger). safe zone)
- Team members are briefed by the Team Leader about the risks of the work area, entry and exit points, 1st and 2nd assembly area, escape route, INSARAG signs/signals.

5- Conducting a rough/quick search (ASR3) by authorized search personnel (4-6 people) (Determination of life spaces, emergency exit routes from the rubble, etc.)
6- If the work area is large as a result of a rough search, building sectorization is performed.
7- Reporting the search results to the Team Leader.
8- Starting to fill in the Work Area triage forms.
9- If, as a result of the rough search, the locations of the possible living beings specified in the notification are determined, the rescue operation is started.
10- If no living creature is detected, the next stage, Full/Detailed search, is started. If a live person is detected in the voice search, the rescue operation is started.
11- If the voice search does not yield any results, technical searches are initiated (K9, seismic acoustic, search cam).
12- Following the casualty location, alternative rescue plan and escape from the wreckage plan are made and all personnel are informed.
13- Operations may be terminated by the Team leader in case of any unforeseen risk (civil disobedience / riots, collapse of nearby structures, explosion, etc.).
14- All operation phases are reported to the Team Leader by the Team personnel, to the Group Leader by the Team Leader, to the Team Leader by the Group Leader, and to the OSOCC by the Team Leader.
15- During rescue operations, the needs of the Team (fuel, water, spare intervention equipment, etc.) are notified via Group Leader, Team Leader, OSOCC/LEMA. In line with the team leader's decision, support or needs can also be provided from other teams.
16- Providing the necessary first aid to the victim with the help of the medical team (in line with the country procedures received from LEMA).
17- Extraction of the casualty and handing over to the local authorities (as per local procedures).
18- Preparation of casualty extraction form (to be submitted to OSOCC).
19- Completion of the work area form at the end of the operation and submission to OSOCC via the Team leader.
20- Search and assessment of other possible living beings in the wreckage. If there is no possibility of life, marking is made and the materials are collected and left the area.
21- The result of the work is reported to the Team leader. Return to the next work area or campsite as instructed.

15 BASIC SEARCH TECHNIQUES

There are some rules for searching and finding casualties in the rubble. Determining the location of the injured is essential for the rescue of the injured. The following procedures are used to determine the location of the injured person by determining the areas and places that can be survived according to the type and type of collapse of the buildings in residences and workplaces.

What is search?

It is the work carried out to locate the location(s) of the disaster victim(s) inside the collapsed structure.

Personal Equipment for Search Personnel

- Personal protective equipment
- Marking materials
- Communication devices
- Warning and alert devices
- Personal supplies

SEARCH METHODS

1- Physical Search **2- Dog Search** **3- Technical Search**

- Visual Search
- Voice / Sign Search

"Silence is Essential"

15 BASIC SEARCH TECHNIQUES

Physical Search

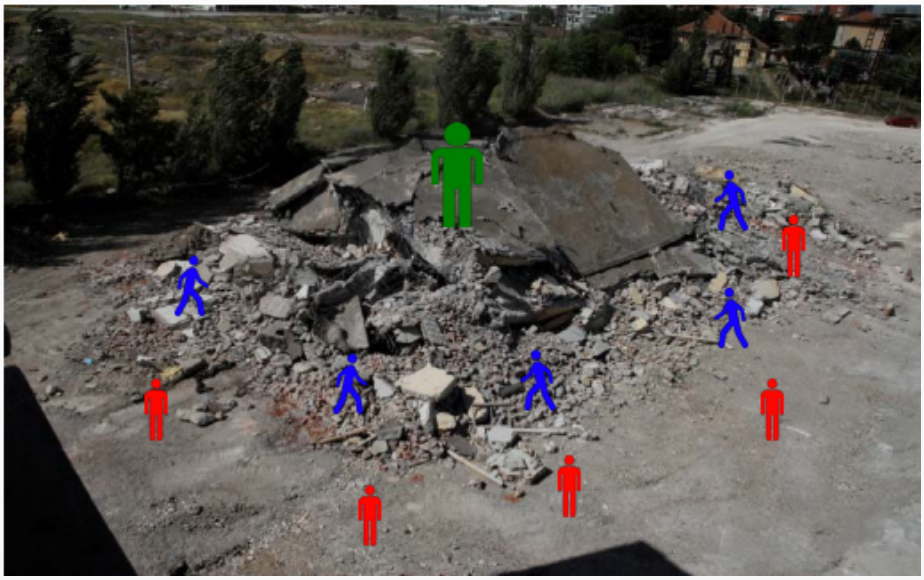
Visual Search / Primary (Quick) Search is the determination of the location of the victim by looking at the places that can be seen around, under and outside the ruins.

Audio-Signal Search / Secondary (Comprehensive) Search

Search personnel take their positions on the wreckage.
Personnel take turns calling into the debris.
They rhythmically hit the debris with a hard object and listen in such a way that they can hear a sound. If it hears any sound, it makes a mark.

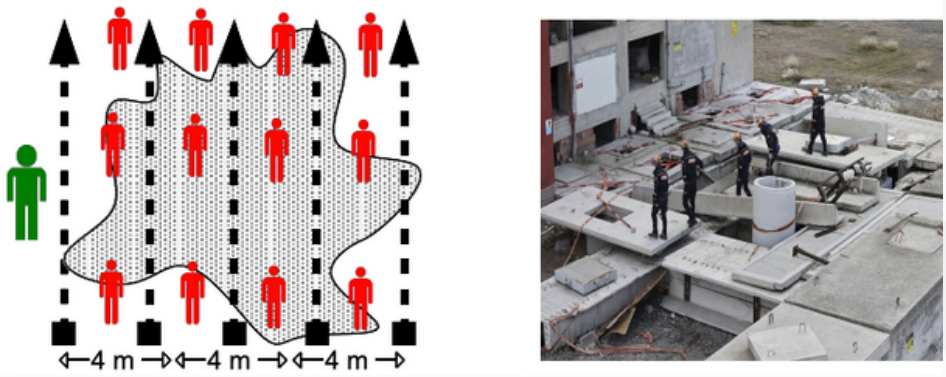
Circle Search Technique

Search personnel are distributed in a circle around the wreckage and apply the Circle Search Technique.



15 BASIC SEARCH TECHNIQUES

Line (Grid) Search Technique
The distance between search personnel varies according to the size of the debris.



Dog Search
It is carried out by accredited search dogs with mission competence. Thanks to their extraordinary sense of smell and special training, rescue dogs make a great contribution to finding living beings trapped under rubble.

How to Use Rescue Dogs?

1.Exceptional Sense of Smell Dogs have a highly developed sense of smell that can detect very small odor particles emitted from the human body. In this way, they can locate living beings under the rubble.
2.Specialized Training Rescue dogs undergo rigorous training:
- Search and Locate: They learn to search systematically in a variety of environments.
- Signaling: They are trained to indicate the presence of living creatures by barking, scratching the ground or other special signals.
- Endurance and Agility: They are physically prepared to navigate difficult and dangerous terrain.
3. Teamwork with Trainer
Success in search and rescue operations largely depends on the teamwork between the dog and its handler. This duo creates an efficient operational capacity thanks to the close bond and communication they develop during training and missions.
4. Advantages in Rescue Operations
- Speed: They can cover large areas in less time than humans.
- Access: They can reach places inaccessible or dangerous for humans.
- Efficiency: They increase the chances of finding survivors in the critical hours following a disaster.

15 BASIC SEARCH TECHNIQUES

Correct Behavior During Canine Search and Rescue Operations

It is very important that everyone in the search area cooperates to facilitate the work of the rescue dogs. The following rules of behavior should be followed:

1. Stay Calm and Quiet

- Avoid Noise: Do not shout or make loud noises that distract or interfere with the dog's concentration.
- Confidential Communication: If talking is necessary, do it quietly and only as much as necessary.

2. Do Not Interact with the Dog

- Not Playing and Calling the Dog: Avoid any physical or verbal contact with the dog while it is working.
- Not Giving Food: Do not give the dog food or treats that may distract it or affect its performance.

3. Follow the Trainer's Instructions

- Show Respect: The trainer is responsible for the dog and its safety; their instructions must be followed.
- Cooperation: Be ready to help if the instructor asks for help and always follow their instructions exactly.

4. Avoid Fouling the Area

- Avoid leaving objects that may confuse the dog.
-Do not smoke or use strong perfumes: Strong odors can interfere with a dog's sense of smell.

5. Maintain a Safe Distance

- Work Zone Do not trespass in the designated search area.
- Safety: Be alert for possible distress signals from the rescue team. Conclusion:

Rescue dogs play a vital role in the search and rescue of lives in collapsed structures. Their effectiveness depends not only on their training and skills, but also on the cooperation and appropriate behavior of everyone involved in the operations.

Technical Search

It is a search conducted by specially trained search personnel using seismic and acoustic listening devices. In the technical search, not only the presence of the casualty but also the location of the casualty is determined.

15 BASIC SEARCH TECHNIQUES

Note: At ASR 3 (Rapid Search and Rescue) level, only physical search is conducted due to the rapid progress of the process. At ASR 4 (Full Search and Rescue) level, all search techniques are performed.

CONSIDERATIONS FOR POST-DISASTER RESPONSE

- Cooperate with professional teams without putting yourself at risk or endangering others.
- Try to ensure the safety of yourself and the environment.
- Be a source of information for search and rescue teams arriving on site.

WHAT NOT TO DO?

- Do not enter damaged structures.
- Do not use heavy search and rescue equipment unless you have training.
- Do not perform improvised rescues.
- Do not spread unsubstantiated rumors.
- Do not direct or take actions to prevent rescue teams from accessing the disaster site.
- Do not do the rescue alone unless you have to or it is your only option.

16 DEBRIS ENTRY TECHNIQUES

In the debris entry technique, attention is paid to the condition of the building or debris. Each building creates different debris.

1. By Disaster Type

a) Earthquake
b) Flood
c) Landslide
d) Avalanche

2. According to Building Structure

a) According to the material used in building construction (wood, masonry, reinforced concrete, steel construction, etc.)
b) According to the number of floors and size of the building

3. According to damage condition

a) Full collapsed building
b) Half collapsed building
c) Partially collapsed building
d) Heavily damaged building

If there is a risk threatening the rescue personnel at the entrance to the buildings, the wreckage is not entered until the risk is eliminated. In earthquakes, aftershocks and damage to the building is one of the biggest risks for the team. The team commander and his/her assistant determine the risk-free, shortest way of rescue and entry into the wreckage, taking into account the above-mentioned situations.

These are

1- Side Entry to the Debris: It is the type of entry made by utilizing the gaps between the floors in the wreckage and by connecting the basements. It is proceeded in the form of opening a hole. It may be necessary to use support materials in this system. Attention should be paid to slip and collapse risks.

2- Top Entry to the Debris: It is the entry of the people whose location is determined from the top by drilling the building floors. It is safer than side entry. However, if the debris is prone to collapse, attention should be paid to the risk of slipping.

3- Removal of Floors: The section to be entered into the wreckage is determined and the concrete slabs are removed by cutting layer by layer. In this system, construction equipment such as compressors, cranes and shovels can be used. However, it is necessary to be very experienced and careful in the use of construction machinery. Work machines should never be placed on the debris. There must be a good harmony between the construction equipment operators and the team commander. The bottom of the parts to be cut and removed should be checked very well, and 2 or 3 spotters from the team should control the work to avoid any danger.

4- Entering the wreckage from below: In cases where entering the wreckage and reaching the victim is long and risky in side and top entry techniques, entry is made from a more distant but safer point from where the victim is located and the victim is rescued by reaching the victim under the ground.

17 SUPPORTING AND SECURING THE WRECKAGE

"Support materials" are the materials used to ensure the safety of the personnel, the material, the injured and to prevent the heavy masses lifted in order to work safely in the wreckage to be secured after lifting and to prevent them from collapsing out of our control during search and rescue operations.

Support Materials

1- Improvized support materials
2- Ready-made support materials
   a) Plastic and polyurethane support materials
   b) Mechanical support materials
   c) Hydraulic support materials
   d) Jacks (auxiliary support equipment)

1- Improvized Support Materials

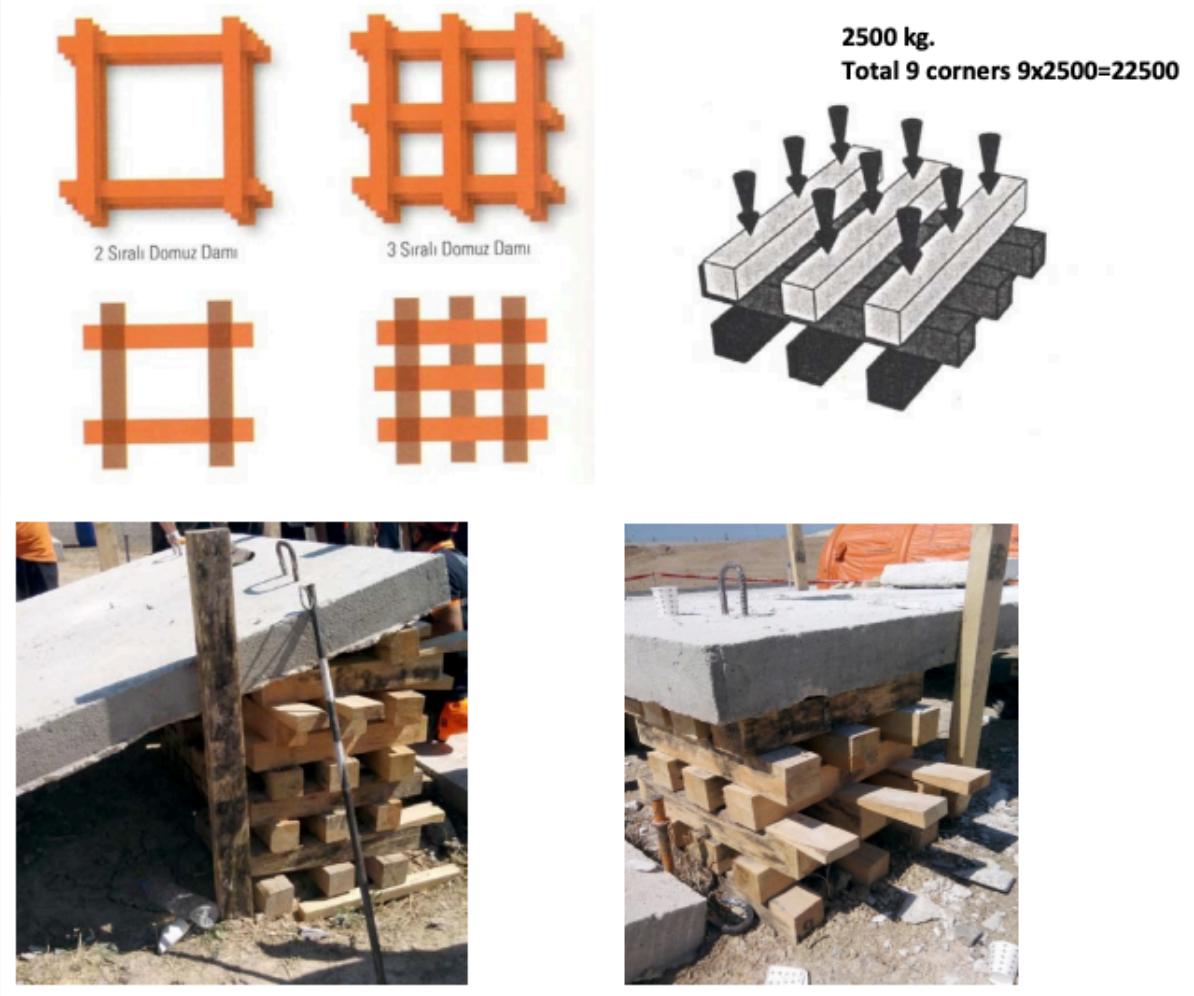
While working among the rubble, open windows and doors that are prone to collapse must be supported and secured. Various methods are used for this.
It consists of securing only the gaps whose edges are prone to collapse by placing a wedge on each side and compressing it with another wedge perpendicular to both wedges. Side walls compressed in this way will not collapse for some time,

Pig Dam

Things to Consider in Pig Dam Construction:

- The fortification is installed in two ways, 2-row and 3-row.
- Considering that each corner of the pig roof made of 10 cm timbers carries 2500 kg, the carrying capacity of a 2-row pig roof is 2500x4=10.000 kg in total.
- Considering that each corner of a 10 cm wooden pig roof carries 2500 kg, the carrying capacity of a 3-row pig roof is 2500x9=22500 kg.
- Under conditions where there are no angular tremors, the base width can be 1/3 of the height ratio. In conditions such as earthquakes and asymmetrical roofs, 1/1 ratio should be applied.

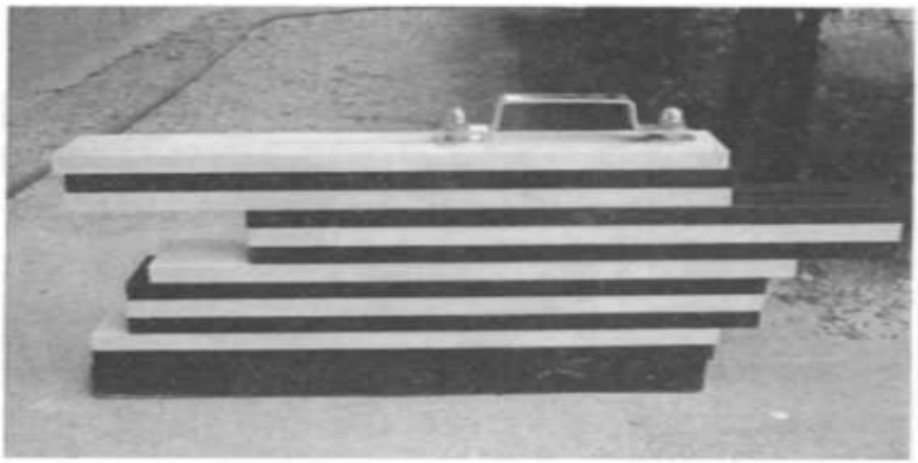
17 SUPPORTING AND SECURING THE WRECKAGE



2- Ready Support Materials

a) Plastic and Polyurethane Materials

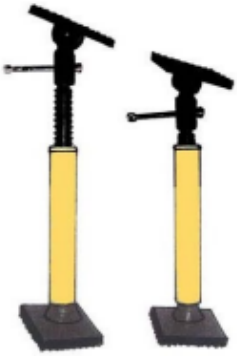
They are made of hard sturdy plastic, come in different sizes like kerosene cans and are portable. They can be used upright and sideways. They have a carrying capacity of 40-50 tons.



17 SUPPORTING AND SECURING THE WRECKAGE

b) Mechanical Supports Support

materials made of metal. They are shaped like a pipe. It has threads inside like a screw. Another piece with threads on it goes inside. They nest together and are raised by a lever. The upper head moves so that the support adapts to the ground. They are non-slip, non-detachable and have serrated ends. They are raised from 60 cm to 1 m.



c) Hydraulic Supports

They work with oil pressure and air. They work in the form of mechanical support and with the hydraulic power of oil. These are devices that work with air pressure, are lifted with 200 - 300 bar air cylinders or suitable pumps, and do not fall thanks to the lock system.

d) Jacks

These are levers used for lifting heavy and large loads during various rescue activities. There are three types of jacks.

Mechanical jack (works with a long arm)

Hydraulic jack (works with pumps)

Screw jack (works on the auger principle)

18 FIRST AID AND TRANSPORTATION TECHNIQUES

In disasters such as earthquakes, it is extremely important to know first aid well in order to save lives from any debris. The most common injuries are internal and external bleeding, head, chest, abdomen, eye injuries, bruises or fractures and burns. There are many things to consider when removing the injured from under the rubble. Hasty rescue attempts may result in new bleeding, new fractures and severe injuries. The first rule is to pull the victim's body out without folding the body, without twisting the neck and waist left and right, back and forth, and by pulling along the body. The possibility that different parts of the injured person's body may still be trapped should also be taken into account.

What is First Aid?

- A person whose life is in danger as a result of an illness or accident,
- At the scene, until paramedics can help,
- To save lives or prevent the situation from getting worse,
- Non-pharmaceutical applications with existing tools and equipment.

In disaster situations, a rapid and organized response can save lives. Proper casualty assessment and mobilization reduces the risk of complications and facilitates the work of medical rescue teams.
The basic rule of first aid is to first ensure the safety of yourself and the environment.

Basic Principles

Hazard: Determine whether the location of the casualty or patient is hazardous, such as gas, electricity, etc.
Transportation: Carry the injured person or patient in a way that is appropriate to the condition of the injury or illness and does not worsen the situation during the removal of the injured person or patient from the dangerous area, transfer to a place where first aid can be provided under more favorable conditions or transfer to the ambulance.
Triage (Separation): Carefully prioritize interventions in cases of multiple injuries or illnesses and adhere to this prioritization.
Diagnosis: Prioritize vital conditions of the patient or injured person such as respiration, circulation, bleeding, shock, consciousness.
Communication: It should be ensured that the necessary health, fire brigade and security teams come to the scene by informing the incident. The interventions to be made for the most common injuries in natural disasters such as earthquakes are as follows;

18 FIRST AID AND TRANSPORTATION TECHNIQUES

Removing the victim from the accident scene:

- The neck should be determined,
- Tools should be used to remove the jam,
- He must get behind the victim,
- He should put his arms under the victim's arms,
- Pull the victim by the arm, • If there is an object stuck to the body, it should not be removed.

Casualty Assessment

a. Measurement of Respiration Rate

1. Visual Observation:
- Position yourself next to the victim and observe the chest and abdomen.
2. Respiration Rate: -
Count the number of times the chest rises in 15 seconds.
- Multiply this number by 4 to calculate the respiratory rate per minute. Normal Range in Adults: 12-20 breaths per minute.
Warning Signs:
- Tachypnea (rapid breathing): More than 30 breaths per minute.
- Bradyypnea (Slow Respiration): Less than 10 breaths per minute.

b. Measurement of Chest Symmetry

It is very important to observe chest symmetry during the assessment of the casualty, as this can reveal serious breathing problems and possible internal injuries. Chest symmetry means that both sides of the chest rise and expand equally during breathing.

c. Heart Rate Measurement

Where to Measure Heart Rate:

1. Radial Artery (Wrist): Place the index and middle fingers on the inside of the wrist (in line with the thumb).
2. Carotid Artery (Neck): Place the fingers in the groove between the trachea and the neck muscle.

18 FIRST AID AND TRANSPORTATION TECHNIQUES

Normal Range in Adults: 60-100 beats per minute.

Warning Signs:
- Tachycardia: More than 120 beats per minute.
- Bradycardia: Less than 50 beats per minute.

d. Checking the Level of Consciousness:
1. Holding the patient by both shoulders,
2. The neck and head are gently shaken, avoiding any movement,
3. Ask "How are you? Are you OK?" loud enough for him/her to hear.

- (Alarm): The victim is awake and responds coherently.
- (Verbal): Responds only to verbal stimuli.
- (Pain): Responds only to painful stimuli.
- (No response): He's not responding at all.

Casualty Triage

Triage is a victim classification system based on the severity of injuries and the urgency of the care needed. It helps prioritize those in need of immediate assistance by optimizing limited resources in emergency situations.

Basic Triage Categories:
- Red (Emergency): Serious injuries requiring immediate intervention.
- Yellow (Urgent): Moderate injuries; intervention may be delayed.
- Green (Minor): Minor injuries; can wait.
- Black (Non-viable): No vital signs or injuries incompatible with life. Steps:
- Assess the Environment: Identify risks such as hazardous debris, fire or gas leakage.
- Perform a Rapid Casualty Analysis:
    - Check for response to stimuli.
    - Verify respiration.
    - Assess circulation and bleeding
- Categorize Casualties: Use available materials to mark categories (scarves, tape, markers).

18 FIRST AID AND TRANSPORTATION TECHNIQUES

Control of Bleeding

Controlling bleeding is a priority in emergencies:

- Pressure should be applied on the bleeding site (using a clean cloth with a finger),
- If the bleeding does not stop, the pressure should be increased using the palm of the hand,
- Keep applying pressure until the bleeding stops,
- If the first cloth is soaked with blood, put a second cloth on top of it (Golden rule: do not remove the first cloth) and continue to apply pressure,
- Check for discoloration and pulse at the end of the wound.

Transport of the casualty

Move casualties carefully to avoid worsening injuries:

- With a blanket: Lay the casualty on their side and roll them on the blanket.

- Log Rolling Technique for Casualty Mobilization:

The "log rolling" technique is used to move casualties with suspected spinal injury. It allows the body to be rotated without bending or twisting the spine, keeping it in alignment and preventing further injury.

- Carrying on Hands with Two People (Golden Cradle Method):

If the patient / injured person does not have a serious injury, he/she is carried with two, three, four hands by making a golden cradle.

Two-handed golden cradle method: Two first-aiders have one hand free, they put these hands on each other's shoulders, grasp their wrists with their other hands and sit the patient / injured person.

Three-handed golden cradle method: The first first helper grasps the shoulder of the second first helper with one hand and grasps the wrist of the second first helper with the other hand. The second first-aider grasps the wrist of the first first-aider with one hand and grasps his/her own wrist with the other hand.

18 FIRST AID AND TRANSPORTATION TECHNIQUES

Four-handed golden cradle method: First aiders grasp the wrists of the other first aider with one hand and each other's wrists with the other hand.

- Placement Techniques on Stretcher:

1. Spoon Technique

This technique is applied by three first aiders if the injured person can only be reached from one side.

- First aiders kneel on one side of the patient/injured person with one knee on the ground.
- The patient/injured person's hands are joined on his/her chest.
- The first first assistant grasps the head and shoulder, the second first assistant grasps the lower back and thigh, the third first assistant grasps the knees and wrists. Then they grasp their own hands by passing them under the body of the patient/injured person.
- With the command of the first first-aider holding the head and shoulder, all first-aiders lift the patient / injured person at the same time and put them on their knees.
- At the same time, they turn the patient / injured person towards their chest with a single movement.
- Then they stand up in unison and put them on the stretcher properly at the same time.

2. Bridge Technique

If the patient/injured person is reached from two sides, it is done by four first assistants.

- The first assistants spread their legs and crouch slightly over the patient/injured person.
- The first first-aider holds the patient/injured person by the shoulders and neck to protect the head, the second first-aider holds the patient/injured person by the hips and the third first-aider holds the patient/injured person under the knees.
- At the command of the first first-aider, all three first-aiders lift the patient.
- The fourth first assistant places the stretcher between the legs of his/her friends and the patient/injured person is placed on the stretcher.

3. Mutual Standing Lifting Technique

It is used for spinal cord injuries and suspected spinal cord injuries. It is applied by three first assistants.

- Two first aiders kneel opposite each other at the chest level of the patient/injured person.
- The third first assistant kneels at the level of the patient / injured person's knees.
- The patient / injured person is made to lie flat with his/her arms crossed over his/her chest.
- The first assistants at the head place their arms on the back of the patient / injured person in a way to protect the head-neck axis.
- The third first assistant at the level of the patient's / injured person's knees opens his/her arms and grasps the patient's / injured person's legs so that they are straight. With the command given, all first assistants lift the patient / injured person straight and place them on the stretcher.

18 FIRST AID AND TRANSPORTATION TECHNIQUES

- Stretcher Transportation Techniques:

General rules for stretcher transportation are as follows:

- The patient / injured person should be wrapped with a material such as a blanket or sheet.
- It should be tied to the stretcher to prevent it from falling.
- The head should be in the direction of travel.
- The stretcher should always be in a horizontal position.
- The first assistant in front should start walking with his/her right foot and the first assistant in the back should start walking with his/her left foot.
- There should always be a responsible person directing stretcher movements and giving commands.
- The stronger first aider should be at the head of the patient/injured person.

1. Stretcher Movement by Two People

- Both first aiders squat down; they stand on the inside of the stretcher at both ends with their backs straight and legs bent.
- On command, they lift the stretcher and start walking with alternating steps.
- The one walking in front is responsible for warning of possible obstacles in the road.

2. Carrying the stretcher by four people

If the condition of the injured person is severe or if the road is long, difficult or obstructed, the stretcher should be carried by 4 people.

- Two of the first assistants squat at the head and the other two at the feet of the patient/injured person, with their backs straight and legs bent, on the sides of the stretcher. They hold the stretcher by the handle and lift the stretcher with the up command.
- The stretcher left by holding first Helpers left, those on the right side start walking with their right footsteps.
- When walking through a narrow area, first aiders place themselves with their backs to the inside of the stretcher.
- When going up and down stairs and slopes, the stretcher should be kept in the most horizontal position possible. For this, those at the feet should hold the stretcher at shoulder level and those at the head should hold it at thigh level.

18 FIRST AID AND TRANSPORTATION TECHNIQUES

- Lap Transport Method:

It is a useful method for conscious children and light adults.

- One hand is held under the knees of the patient / injured person and support is taken.
- With the other hand, the weight of the torso is loaded and grasped from the back.
- The patient/injured person can be told to put his/her arms around the neck of the first-aider. This makes the injured person feel safe.
- The weight is given to the knees and the patient gets up.

- Back Carrying Method:

It is used to carry conscious patients.

- The first assistant squats with his/her back to the patient/injured and grasps his/her legs.
- The arms of the patient / injured person are joined on the chest of the first aid. The patient/injured is lifted by putting weight on the knees.

Crush Syndrome

Crush syndrome, also known as crush syndrome, is a tissue injury that occurs as a result of crush injury, prolonged compression and immobilization in natural disasters such as earthquake trauma.

Crush syndrome is a serious medical condition that occurs when debris or a heavy structure compresses a part of the body for a long time after a collapse following disasters such as earthquakes.

What Happens in the Body During Crush Syndrome?

In an earthquake, there is a lot of weight on the body buried under the rubble. When the earthquake victim is removed, the pressurized areas are released and blood flow begins. Toxic substances in the damaged muscle tissue enter the bloodstream. Elevated levels of these substances in the blood can cause toxic and fatal complications. These complications include internal and surgical complications such as acute renal failure, heart failure, respiratory failure, infections, compartment syndrome, bleeding. Because of these fatal rhythms, a person who is doing well under the rubble may die after being rescued.

Prolonged Pressure on Muscles:

When a limb or body part is under something heavy, muscle cells are severely damaged and toxic substances are released into the bloodstream:

- Myoglobin: Can damage the kidneys.
- Potassium: Can affect the heart and cause arrhythmias.

18 FIRST AID AND TRANSPORTATION TECHNIQUES

How to Respond to Crush Syndrome?

- Do not lift the load on the body without medical assistance: Lifting the trapped part can worsen the condition. When the load is removed, it can increase the release of toxic substances into the system.
- Keep the person warm and calm.
- Avoid giving food or water to the trapped person.

First Aid in Shock:

- The victim should be placed on his/her back,
- Check for signs of bleeding and shock;
- Visible bleeding
- Pale skin
- Coldness in the limbs
- Fast pulse
- It should be lifted 20-30 cm by placing support under the feet,
- The injured person should be wrapped in a blanket (so that the dressing and tourniquet, if any, are visible),
- This position should be maintained until medical help arrives,
- Respiration and pulse should be checked at 3-5 minute intervals.

First aid in case of limb amputation:

- The victim should be placed on his/her back,
- The victim's legs should be raised by 20-30 cm,
- Apply a tourniquet (3-4 fingers above the severed limb),
- The severed piece should be placed in a clean, waterproof sealed plastic bag.

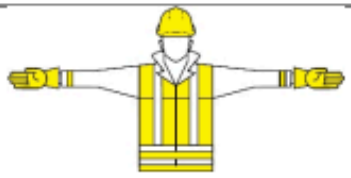
19 COORDINATED WORK WITH CONSTRUCTION MACHINERY

1- When working with construction equipment in the earthquake zone, firstly AFAD Provincial Crisis Center should be contacted and work should be carried out in the area / building / debris determined by AFAD.
2- All works (debris removal, building demolition, loading works, etc.) must be carried out under the coordination of AFAD or with authorized search and rescue teams accredited by AFAD.
3- Before starting to work in building debris, it should be remembered that all personnel cannot enter the debris area without full Personal Protective Equipment (PPE).
4- While working in the debris field, emergency escape routes and safe working area should be determined in advance in coordination with the debris / site authority.
5- Before starting work in the building rubble, underground / aboveground power lines, water and natural gas lines should be checked and work should be started after making sure that they are closed.
6- During the works, communication between machine operators, signalmen and search and rescue personnel on the wreckage is very important. For this reason, continuity of communication (telephone, radio and beacon) should be ensured to prevent accidents or negative situations that may occur during debris removal.
7- In debris removal and building demolition works, each work machine should be selected and used in accordance with its production purpose and capacity.
8- Excavators should be equipped with ignition suitable for the type of work to be done.
9- In debris removal works, more careful work should be carried out as there are often dark, dusty situations where the view is not good and there is a danger of a material falling from the top.
10- In debris removal works, there may be situations where work should be done on different slopes and ground. Possible slipping / tipping risks of construction machinery should be evaluated.
11- While working in the rubble with construction equipment, situations such as possible aftershocks or the collapse / collapse of the adjacent buildings and the building where the work is carried out should not be forgotten.
12- All personnel working in the debris field should pay attention to the maneuvering areas of construction equipment.

"Work Machinery Guidance Signs
The hand and arm signs used to guide the movements of some work machines and lifting vehicles are made according to the "Regulation on Health and Safety Signs", which was prepared based on Article 30 of the Occupational Health and Safety Law No. 6331 dated 20/6/2012 and published in the Official Gazette No. 28762 dated 01/09/2013 and entered into force. The hand and arm signs given in this regulation to guide transportation movements are given below:

19 COORDINATED WORK WITH CONSTRUCTION MACHINERY

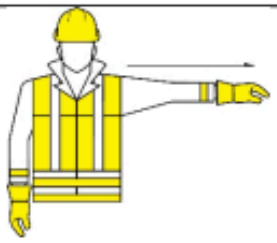
A. General Signs

Meaning	Recipe	Figure
START Get ready Start command	Both arms parallel to the floor with palms facing forward	
STOP Interrupt / break Stop motion	Right arm raised with palm facing forward	
OK. End of the process	Both arms at chest level, hands clasped	

B. Vertical movements

Meaning	Recipe	Figure
REMOVE	With the right arm raised, palm facing forward, slowly draws a circle	
DOWNLOAD	Slowly draws a circle with the right arm lowered towards the floor with the palm facing inward	
VERSE DISTANCE	Distance is expressed by the space between both hands	

C. Horizontal Movements

Meaning	Recipe	Figure
FORWARD	Both arms are bent at waist level with palms facing upwards, arms are bent at the elbows and move upwards.	
BACK	With both arms bent in front of the chest with the palms facing down, the arms are bent at the elbow and slowly moved away from the body.	
RIGHT Right of pointer*	Small slow movements to the right with the right arm extended to the right parallel to the floor with the palm facing the floor	
LEFT Left of pointer	Small slow movements to the left with the left arm extended to the left parallel to the floor with the palm facing the floor	
HORIZONTAL DISTANCE	The space between the hands refers to the distance	

19 COORDINATED WORK WITH CONSTRUCTION MACHINERY

D. Danger

Meaning	Recipe	Figure
KES Emergency pose.	Both arms raised with palms facing forward	
FAST	All movements faster	
SLOW	All movements slower	

Minimum Requirements for Health and Safety Signs in Operations with Lifting Devices:

1. The lifting, lowering or transportation of loads in lifting machines is carried out according to the hand and arm signals to be given by trained signalers.
2. In cases where more than one employee is assigned to a lifting machine, the operator of the lifting machine will take a signal from only one of the signalman or other officials and the signalman will stand in places that can be easily seen by the operator. The operator shall always fulfill every stop signal, no matter who gives it.
3. In order to warn the workers during the movement of the lifting vehicles or the lifted load, the operator shall signal with clearly audible bells, lighted signs and the like, and these shall operate continuously in motion.
4. If repairs are made to the vehicles, warning signs are placed on the vehicles and in appropriate places that repairs are being made.
5. The heaviest loads to be lifted by lifting vehicles shall be indicated as information signs inside or outside the cabins and when more than the heaviest load that can be lifted is lifted, an automatic warning device with sound and light shall be provided.
6. The bells and light signs used in lifting vehicles must be different from other signal sounds and light signs in the workplace, must be strong enough to suppress the noise generated by other machinery, must be easily recognizable and must be the same for all lifting vehicles operating in the same workplace.
7. Where heavy items are lifted or moved in teams, pre-specified coded movements and signs are used.

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