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Sustainable Accessible Future Environments

T 2.5

**Creating tools for planning
evacuation of individuals** in time
of crisis, such as war, and for safe,
accessible travel planning.



SAFE

SUSTAINABLE, ACCESSIBLE FUTURE ENVIRONMENTS

The course is a collaboration between five European Universities

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T2.5 Creating tools for planning evacuation of individuals in time of crisis, such as war, and for safe, accessible travel planning

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1.0 | INTRODUCTION

The urban space represents an area of high concentration of people, infrastructure, and services. With its combination of buildings, open spaces, and interconnected networks, it offers numerous qualities and comforts to its residents and visitors but also harbors potentially significant hazards. In the case of an unpredictable hazardous event, its consequences can quickly spread, cause considerable damage, or even become fatal. That is why it is crucial to be aware that any space can be extremely fragile and vulnerable when faced with a hazard that is not necessarily the result of natural processes, but may also stem from human activity or a combination of both.

In urban space, vulnerability and exposure often relate to crowding, limited evacuation routes, and the concentration of multiple functions within a confined area. In such circumstances, individual response is crucial. These responses are far more effective when the space is properly prepared with clearly marked routes, accessible information, and an established action plan that is up-to-date. All of this is encompassed within the concept of evacuation and its preparation. Mass evacuation planning should ensure the movement of people to a safe location, while minimizing risk and ensuring safety throughout the process (ISO, 2014; Gantt & Gantt, 2012). The safety of urban spaces does not begin with the sound of a siren or other alarm, but with awareness, systematic training, and preventive preparation. Disaster risk reduction requires an understanding of hazard characteristics, exposure and vulnerability, as well as the capacity of people and places to respond (UNDRR, 2017). Equally important as knowing what to do in an emergency is being prepared before departure. When traveling to an unfamiliar environment, a basic understanding of the area, its characteristics, and potential risks enables quicker and more confident action, thereby increasing safety and reducing the likelihood of unpleasant surprises in the field.

From this perspective, this evacuation tool represents one of the steps along that path, as it begins by explaining key terms and providing essential information for understanding evacuation in urban space. It is primarily intended for individuals, helping them to recognize risks and respond effectively in unfamiliar environments. However, larger organizations, educational institutions, and local authorities may also find the presented methods useful, as the material reflects the perspective and decision-making process of an individual. This evacuation tool is developed as part of the Mapping Handbook within the SAFE project, focusing on practical fieldwork and spatial awareness in urban environments. In addition to theoretical foundations covering the types of disasters that can occur in an urban space and the appropriate responses to them, the evacuation tool offers a practical knowledge assessment using a mapping method to create an evacuation plan. This approach provides individuals with the opportunity to consolidate their knowledge and preparation so that, upon first encountering a new urban space, they can identify hazards, evaluate both the positive and negative elements of the environment, and plan a safe evacuation from the endangered area.

2.0 | PRE-TRIP SAFETY

Safe travel planning

Traveling to unfamiliar urban areas is an opportunity for exploration, but also a situation that carries certain risks. The safest way to approach any new destination is through preparation before departure. This includes understanding the local environment, identifying potential hazards, and planning your movements so that you can respond effectively if something unexpected occurs. Good preparation reduces exposure to risks, shortens reaction time in emergencies, and increases your confidence in navigating new spaces.

"Preparedness is the knowledge and capacities developed by governments, response organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent or current hazard events or conditions". (UNDRR, 2017).

Safe travel planning Checklist

Before departure

Travel documents - valid passport/ID, travel insurance, emergency contact list (printed and digital), bank cards

Weather forecasts - possible climate related risks (storms, floods, heatwaves)

Destination research - Google Maps, offline maps, emergency services

Local hazards - common natural hazards (earthquakes, floods, storms) and man-made hazards (industrial zones, heavy traffic) that are specific to your travel destination

Important numbers - local emergency services, embassy, consulate, accommodation

Health - vaccinations, medication

Technology - fully charged phone, power bank, offline maps, translation apps

Socio-political context - recent local news, possible curfews or security restrictions, official travel advisories, event calendars for protests, strikes, elections, or civil unrest.

On Arrival

Observe the surroundings - street layout, nearest exits, safe assembly points near your accommodation.

Evacuation routes - inside the buildings you are staying and moving

Safe meeting points - agree with travel companions where to meet if separated

Communication plan - share your location via phone or message

During the stay

Be aware of the situation - monitor weather, crowd behavior, official alerts and news

Adapt routes and areas - in case of blocked streets or unsafe areas

3.0 | HAZARD

Hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. In the same sense disaster is also a serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity. Hazards may be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity or magnitude, frequency and probability. (UNDRR, 2017).

United Nations Office for Disaster Risk Reduction classifies hazards into 3 main categories:

Natural hazards: Hazards that arise primarily from natural processes and phenomena, such as earthquakes, floods, storms, and fires.

Anthropogenic (man-made) hazards: Hazards induced entirely or predominantly by human activities and choices, for example industrial accidents, toxic spills, transport mishaps, or failed infrastructure.

Socionatural hazards: Hazards that result from a combination of natural processes and human influences, such as environmental degradation or climate-driven land instability.

The following section presents six selected hazards that are among the most common in urban space or have the most significant consequences. It is important to emphasize that many other hazards exist, whose occurrence and impact are closely linked to the local context, the characteristics of the area, land use, and its spatial setting. In addition to the definitions of each hazard, key signs, recommended actions, and typical safe zones for each hazard are also presented.

1. FIRE

Urban fires can spread rapidly due to dense building structures, limited evacuation routes, and smoke that quickly reduces visibility and breathing capacity. They are considered sudden events that can threaten life, property, and the environment, and may be triggered by technical faults, human actions, or natural causes (European Environment Agency, 2004).

Signs

- Visible flames or smoke,
- smell of burning,
- heat,
- triggered alarms,
- smoke plumes,
- cracking sounds from materials.

Actions

- Avoid the fire area,
- stay low,
- follow marked evacuation routes.

Typical safe zones

- Open areas,
- Assembly points away from the fire,
- upwind locations where smoke is not drifting toward you.

2. EARTHQUAKE

Earthquakes occur when accumulated tectonic stress is suddenly released, producing ground shaking that can damage buildings and infrastructure. In cities, secondary hazards such as falling glass, fires, and utility failures often compound the danger. In Europe, earthquake hazard is described as the expected level of ground shaking at a given location due to potential future earthquakes, forming the basis for seismic design and preparedness measures (Danciu et al., 2021).

Signs

- Ground shaking,
- falling objects or glass,
- visible facade damage.

Actions

- Take the Drop, Cover, Hold On position,
- evacuate only when shaking has stopped and routes are safe.

Typical safe zones

- Open areas away from buildings, power lines, and other structures

3. FLOOD

Urban flooding can occur even outside designated floodplains due to intense rainfall, impermeable surfaces, and overwhelmed drainage systems, creating dangerous currents and debris flows. Under EU law, a flood is the temporary covering by water of land not normally underwater, including river overflows, torrents, and coastal surges, but possibly excluding sewer-related flooding (European Parliament & Council, 2007).

Signs

- Rapid water accumulation,
- flooded streets or curbs,
- strong currents.

Actions

- Avoid walking or driving through floodwaters,
- move to higher ground,
- continuously monitor the situation, as flood conditions can change extremely fast, sometimes within seconds - so stay alert and be ready to move

Typical safe zones

- Elevated streets,
- raised buildings,

4. STRONG WINDS (including tornadoes and hurricanes)

Severe wind events in urban areas can cause structural damage, generate airborne debris, topple trees and power lines, and obstruct evacuation routes. Staying indoors and away from windows during the peak hazard reduces risk. In Europe, severe windstorms are recognized as among the most damaging natural hazards, causing high economic losses and widespread disruption to infrastructure and transport systems (European Environment Agency, 2021).

Signs

- Airborne debris,
- falling branches or trees,
- broken glass.

Actions

- Seek shelter in sturdy indoor spaces away from windows,
- exit only after winds have subsided.

Typical safe zones

- Interior corridors or windowless rooms,
- cleared streets after the storm.

5. TERRORISM (including armed attacks)

Terrorist acts or armed attacks in urban environments can be sudden, deliberate events involving explosives, firearms, vehicles, or hazardous substances. They create panic, multiple hazards, and complex evacuation conditions. Within European civil protection frameworks, they are classified as intentional man-made hazards requiring specific planning for safe exit routes, secure assembly points, and rapid situational assessment (Council of the European Union, 2014).

Signs

- Explosions,
- people screaming,
- sudden panic or chaotic movement in the crowd,
- gunfire,
- fast-moving hostile vehicle,
- chemical odors or suspicious substances.

Actions

- Follow the Run-Hide-Report rule,
- use covered routes,
- follow police instructions,
- stay calm and don't follow other people blindly
- Avoid causing mass panic or crowd movements that could endanger fallen individuals

Typical safe zones

- Secure buildings,
- protected areas,
- police-designated locations.

6. HAZARDOUS MATERIALS (technological accidents)

Technological accidents in urban areas can result from industrial processes, transport incidents, or infrastructure failures, leading to chemical spills, explosions, fires, or radiation releases. Under the Seveso framework, a major accident is defined as an uncontrolled event, such as an explosion, fire, or toxic release that poses serious danger to human health or the environment, often requiring urgent evacuation or shelter-in-place measures (European Commission-JRC, 2003).

Signs

- Chemical odors,
- spills,
- hazard signage,
- people showing symptoms such as nausea or breathing difficulties.

Actions

- Move crosswind or upwind from the source
- avoid low-lying areas,
- shelter in place if advised,
- stay indoors, close windows and ventilation
- follow official news updates, and avoid calling emergency numbers to keep the lines free for urgent cases

Typical safe zones

- Open upwind areas from the hazard,

4.0 | PREPARING FOR EXTREME SITUATIONS

Extreme situations such as armed conflicts, terrorist attacks, or sudden breakdowns of critical infrastructure are rare but possible events that can heavily affect urban life. They can cause disruption of communication, transport, and essential services, leaving individuals temporarily isolated and dependent on their own preparedness.

"Preparedness and prevention are essential elements in reducing the impact of disasters and emergencies, enabling people and communities to react more effectively."

(European Commission, 2020)

Preparation begins with awareness and calm planning. Understanding local risks, following verified information sources, and knowing basic emergency procedures help individuals maintain control and make better decisions under stress. A culture of prevention and preparedness is the most cost-effective investment in resilience and disaster risk reduction (UNDRR, 2019). Even simple actions, such as keeping essential items ready, knowing where to go, and having a communication plan can make a significant difference. In some situations, access to transportation, the internet, or electricity may be lost. Therefore, it is crucial to rely on basic resilience skills: remain calm, think clearly, prioritize safety, and support others when possible. Reliable preparedness does not mean fear, but readiness to adapt and respond.

Basic Guidelines for Extreme Situations:

- Stay informed:** Follow official communication channels (government, EU Civil Protection, Red Cross). Avoid misinformation and unverified social media content.
- Keep essentials ready:** Identification, first-aid supplies, water, non-perishable food, flashlight, battery pack, cash, and a small radio.
- Plan communication:** Agree on how to contact or reunite with family or colleagues if networks fail.
- Identify safe spaces:** Know the nearest shelters, assembly points, or protected indoor areas.
- Know escape routes:** Study alternative evacuation routes in case primary roads are blocked.
- Follow official instructions:** Wait for clear information before moving; spontaneous evacuations can increase risk.
- Help responsibly:** Offer assistance to vulnerable persons if safe to do so, but avoid taking unnecessary risks.
- Stay calm:** Focus on simple, clear steps; stress management helps maintain rational decisions

Avoid calling emergency numbers or burdening emergency officials if you don't have a real emergency at hand. They are doing their best to help.

5.0 | EVACUATION

When a hazard shifts from a possibility to reality, the ability to evacuate quickly and in an orderly manner becomes crucial. Evacuation refers to the planned movement of people from a threatened location to a safer area. It involves structured phases such as preparing the public, deciding when to evacuate, warning systems, analyzing evacuee movement, and arranging appropriate shelter, especially in mass scenarios like urban areas (ISO 22315:2014). Effective evacuation also requires close cooperation and coordination between different authorities before, during, and after the incident to ensure a safe and organized response.

Purpose of the evacuation:

- relocate people away from imminent danger,
- reduce exposure to hazards,
- maintain public order,
- ensure continuity of essential services,
- provide authorities with the space and conditions needed to manage and stabilize the situation effectively.

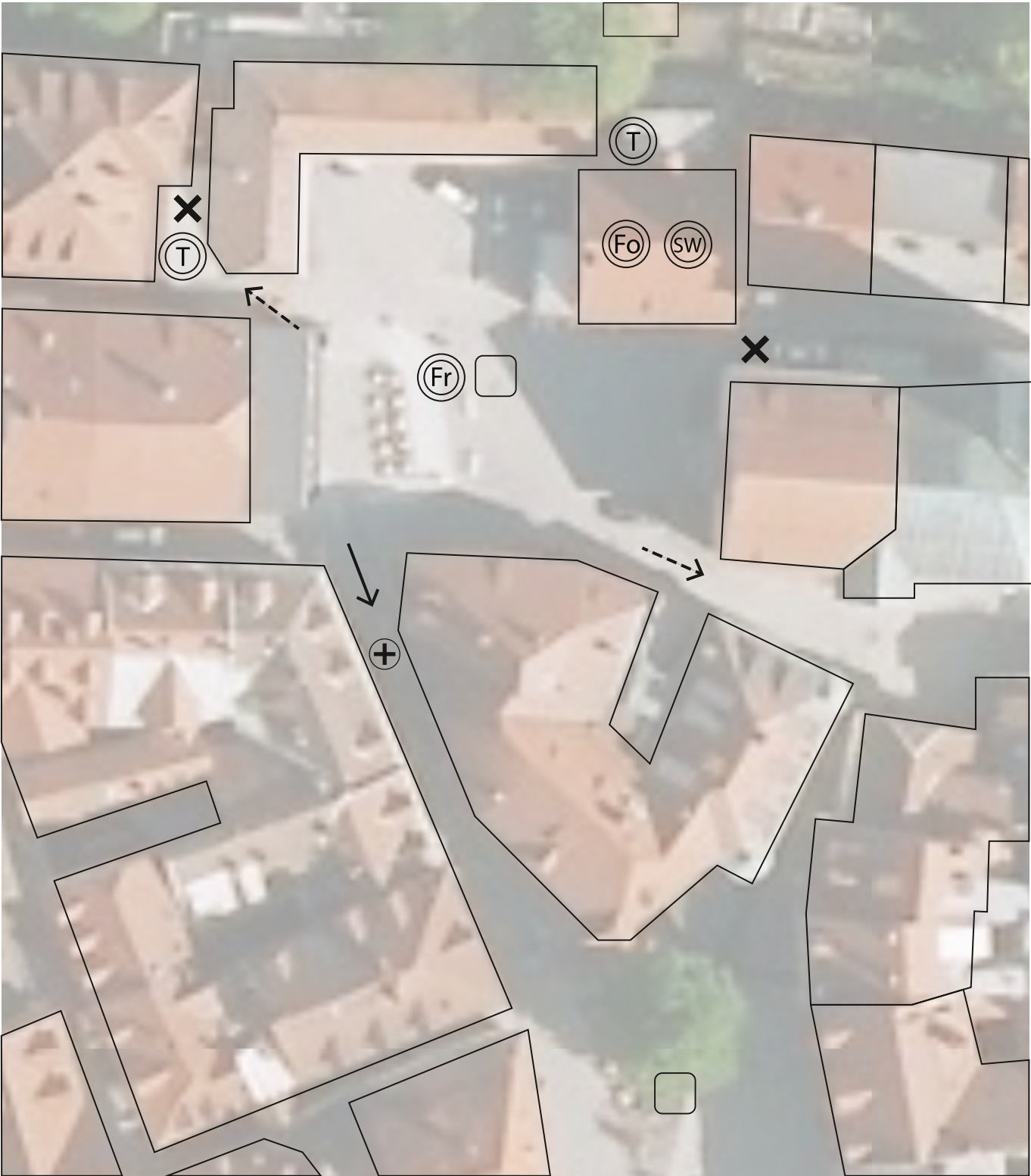
Depending on the various triggers and timing of evacuation measures, **evacuation types** can be grouped into **three main categories**:

- **Preventive evacuation** - conducted before a hazard directly threatens the area
- **Emergency evacuation** - carried out during the onset of a hazard
- **Phased evacuation** - carried out in several phases to avoid delays and congestions during implementation

Basic steps of the evacuation procedure (ISO 22315:2014)

- **Preparation** - planning routes, assembly points, and communication channels.
- **Decision** - determining when and who to evacuate, and who authorizes the action.
- **Warning & Communication** - issuing clear alerts via sirens, SMS, public address systems, etc.
- **Movement** - guiding people along safe, accessible routes.
- **Shelter** - relocating evacuees to designated safe zones or facilities.

URBAN EVACUATION PLAN | EXAMPLE



Legend of the symbols

Indicate direction north 

Primary evacuation route		Open safe zone (suitable distance from buildings)		Possible assembly point / shelter Strong winds - indoor windowless spaces	
Secondary evacuation route					
Exit points		Protected indoor space (windowless corridor)		Possible assembly point / shelter Terrorism - cover points	
AED point					
Emergency vehicle access		Possible assembly point / shelter Fire - open area		Possible assembly point / shelter Hazard materials - open area	
Obstacle (stairs, extremely narrow passage, fence)		Possible assembly point / shelter Earthquake - open area away from structures		Possible assembly point / shelter Flood - high elevated spots	
Existing hazard (glass, gas, flooded area)					

URBAN EVACUATION PLAN | LAYOUT

Paste your photo here

Legend of the symbols

Primary evacuation route		Open safe zone (suitable distance from buildings)		Possible assembly point / shelter Strong winds - indoor windowless spaces	
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Indicate direction north 

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