

INTERREG-IPA CROSS-BORDER COOPERATION
PROGRAMME
ROMANIA-SERBIA

SEARCH & RESCUE
- FIRE -

7 Septembrie 2023

Particularities

1. Time-sensitive nature: Fire incidents demand immediate action as they can spread rapidly and endanger lives. Time is of the essence, and rescue teams must act quickly to locate and evacuate trapped individuals.
2. Hazardous environment: Fires produce extreme heat, thick smoke, and toxic gases, making the rescue environment highly hazardous for both victims and responders. The risk of structural collapse is also increased, posing additional dangers.
3. Limited visibility: Smoke reduces visibility to almost zero, making it challenging for rescue teams to navigate and locate victims. Specialized equipment like thermal imaging cameras and personal protective gear is essential for search and rescue operations.

Particularities

4. Potential for entrapment: In fire incidents, people may become trapped in confined spaces, such as rooms, basements, or elevators. Rescuers must be trained to handle confined space rescues safely.
5. Communication difficulties: Smoke and noise from the fire can hinder communication between victims and rescuers. Radios and other communication devices need to be reliable and equipped with features that minimize interference.
6. Need for thermal imaging: Thermal imaging technology is critical in identifying heat signatures and locating victims hidden behind walls or in smoke-filled areas.
7. Rapid fire spread: Fires can spread rapidly and unpredictably, making it essential for search and rescue teams to continuously reassess the situation and evacuate if conditions become unsafe.

Particularities

8. Team coordination: Successful fire rescue operations require excellent coordination among different teams, including firefighters, search and rescue personnel, medical teams, and incident commanders.
9. Specialized training: Search and rescue teams involved in fire missions should receive specialized training in fire behavior, hazardous materials, confined space rescue, and self-rescue techniques.
10. Support and logistics: Fire rescue missions may require additional support, such as water supply for firefighting efforts, emergency medical services, and logistical support for personnel and equipment.
11. Emphasis on self-rescue: In some cases, victims may need to be trained in basic self-rescue techniques, such as staying low to avoid smoke, using improvised escape routes, and signaling for help.
12. Emotional toll: Fire rescue missions can be emotionally taxing for responders, witnessing the aftermath of fires and dealing with traumatic situations. Proper support and debriefing are essential for the well-being of rescue personnel.

Priorities

- During, and immediately following a fire emergency, the first priorities of fire services are life safety, fire control, and property conservation.
- Limited access to roads, weather conditions, inadequate water supply, and limited resources may hamper and slow the response time of responders.

Situational awareness applied to fireground SAR

- The success of search and rescue operations relies heavily on firefighters' situational awareness. Unlike tunnel vision, situational awareness involves observing the scene with a focus on the bigger picture. Important questions, such as the **fire's location** and whether the structure is occupied, help establish an open view of the situation upon arrival.
- Search and rescue can be integrated into the tactics of an interior attack team or operate independently, solely dedicated to finding and rescuing victims. Regardless of how it's initiated, **predicting fire spread and the risk of structural collapse** form the basis of planning any search and rescue operation.
- Maintaining **effective communication and coordination** with on-scene command is vital for search and rescue teams' situational awareness. They need to know the location and status of other tasks like ventilation and extinguishment to plan their movements and assess risks accurately. **Clear communication, a well-defined entry plan**, direction through the structure, and **an exit strategy** are essential for ensuring safe and effective search and rescue operations.



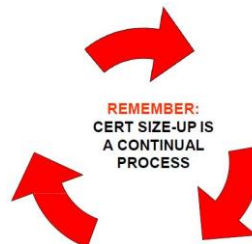
Search and rescue size-up

- Prior to making any entry, it is crucial to conduct a **comprehensive assessment of the situation**. An officer conducting a walk-around the building can gather **essential information**, such as the occupancy status, building type, location of doors and windows, and predict the fire's location and movement by observing smoke conditions.
- This tactical data forms the foundation for a **risk/benefit analysis**, which helps determine whether to conduct a search, either before or during suppression activities. If there are indications of occupants, such as civilian information or clues like parked vehicles, the search and rescue operation becomes a top priority and is integrated into a coordinated fire attack, provided sufficient response resources are available.
- Certain areas of a structure are more likely to have occupants, such as bedrooms at night or assembly areas, work zones, and kitchen facilities. Basements and bathrooms may also be places where occupants seek refuge during emergencies.
- **Preplanning and access to building plans** are valuable assets for search and rescue teams. Knowing the structure's layout enables teams to anticipate hazardous areas, probable locations of occupants, exit strategies, and general building orientation. These tools enhance the effectiveness and safety of search and rescue operations.



SIZE UP

1. Gather Facts
2. Assess Damage
3. Consider Probabilities
4. Assess Your Situation
5. Establish Priorities
6. Make Decisions
7. Develop Plan of Action
8. Take Action
9. Evaluate Progress





Firefighter orientation

- The success and safety of SAR operations rely on building orientation and the ability of firefighters to **maintain a mental map of their location inside a structure**. It is a challenging task, essential for search progression, area accountability, and firefighter well-being.
- In the Incident Command System, buildings are labeled with letters (Side A, B, C, and D) in a clockwise manner, with the addressable or street side of the building being the A side. This **labeling system** provides immediate location references, making it easier to identify positions within the structure. For instance, if there is a fire on the second floor of the B/C corner, firefighters can quickly determine that it is at the back corner on the left side of the building.
- Using compass points might be suitable in open spaces, but **adhering to the ICS definitions** ensures a universal understanding and facilitates cooperation between firefighters from different agencies.
- Maintaining orientation within a smoke-filled structure can be particularly challenging, even for experienced firefighters. To overcome this, firefighters employ defined search patterns and specific techniques depending on the type of search being conducted..



SAR fundamentals

- The primary objective of a search and rescue team in a fire situation is to **locate and ensure the safety of victims**. However, before initiating any search, the presence of survivors must be highly probable. **If the risk is deemed too high, the team cannot proceed with entry.**
- As with any search operation, **teamwork** is vital, along with **accountability**, full Personal Protective Equipment (**PPE**) for each team member, the appropriate tools for the task, and an adequate air supply. It is crucial to prevent accidents that might compromise a team member's ability to participate in the search.
- Maintaining **radio contact** with command is essential, and team members must continuously monitor radio traffic for any changes in fire conditions, regardless of the search method being used. **Staying connected and informed** is crucial for the safety and effectiveness of the search and rescue operation.

Prioritizing search areas

- Before initiating a search operation, it is crucial to establish priorities. This involves determining **the order of search areas**, giving **priority to locations severely threatened by fire** and potential spots with a higher likelihood of finding **a large number of victims**.
- The search priority is closely linked to the behavior of the fire. Since heat, smoke, and flames tend to rise and spread outward, **the primary search areas are the immediate fire location and the fire floor**. The **next priority is the floor directly above the fire spread**, followed by the remaining floors above, **starting from the top floor and moving downward**. After completing the primary searches, the focus shifts to conducting secondary searches on all floors below the fire.
- When conducting a structural search, two main objectives are pursued: **searching for potential survivors and assessing fire conditions**. These objectives are achieved through two types of searches: **primary and secondary searches**. The **primary search** aims to swiftly and efficiently **locate occupants** before or during fire extinguishment. On the other hand, the **secondary search** is carried out **once the situation is under control** and is conducted in a thorough and methodical manner.

Primary search

- Primary searches are of utmost importance in swiftly locating survivors and ensuring the safety of firefighters. These searches are conducted using established patterns of movement and proven techniques.
- **A traditional primary search involves teams of two firefighters** maintaining visual, voice, or physical contact with each other. They use recognized techniques like **wall contact** and **directional turns** while conducting a room search in a consistent clockwise or counterclockwise direction throughout the operation.
- In small spaces, an effective primary search technique called **an oriented person search** is utilized. One firefighter anchors the area with a powerful light and, in some cases, an interior hoseline. The lead firefighter remains oriented to the building while directing teammates around the room. They maintain contact with walls and other team members through hand contact, web strapping, or using a tool or line extension.
- Firefighters sweep the wall with their hand to feel for door openings, windows, furniture, appliances, and potential victims. Throughout the search, it is crucial for firefighters to adhere to established procedures, check door temperatures, be vigilant for fire spread, and always have an **exit strategy** in mind. Consistency and attention to safety protocols are paramount during primary search operations.

A safe primary search

- firefighters must always work in pairs, they must conduct thorough size-ups and have a well-defined and communicated plan.
- it is crucial to have Personal Protective Equipment (PPE), including PASS devices, Self-Contained Breathing Apparatus (SCBAs), and functional tools.
- firefighters should control the door, maintain contact with a wall, constantly monitor fire conditions, and stay oriented to the structure. The use of hand lights and entry tools, including a thermal imaging camera (TIC), enhances visibility and ensures survivability in case conditions worsen.
- effective communication with team members and command is vital for search safety.
- if a victim is found, the situation can be relayed, and rescue efforts can be initiated with the potential for additional help or equipment if needed.
- to uphold safety in all search and rescue operations, command must have current and accurate information on the locations of search teams.

VEIS - vent-enter-isolate-search-

- VEIS is another primary search technique that heavily relies on **clear communication with command, teamwork with a partner**, vigilance for fire spread, and having a hoseline available, even if it's positioned outside the structure. This technique is specifically designed for swift searches in areas that are under threat, such as bedrooms located above a kitchen or living room fire.
- To execute VEIS, a firefighter starts by **opening a small area of the structure**, like a bedroom window, from a ladder or porch roof. Ensuring a constant atmosphere, the firefighter gains entry through the window and proceeds to close the door behind them. A thorough search is conducted, checking under beds, behind furniture, and in closets or adjoining bathrooms.
- Upon exiting, the firefighter uses the same route they entered and promptly communicates with command. This approach clears seemingly unaffected areas, enabling a more focused and prompt extinguishment response. VEIS is an efficient method for searching threatened regions, ensuring the safety of both occupants and firefighters.



Secondary search

- **After the situation is brought under control** and conditions improve, a secondary search of the structure is conducted. This thorough search involves skilled and practiced techniques to comb through debris and the building, aiming to locate any victims who were not discovered during the primary searches. The secondary search is considered complete only when all areas of the building are thoroughly searched, and the markers from the primary search are verified.
- Even though firefighters conducting secondary searches are still exposed to hazardous conditions, they can be more methodical in covering all areas. During this phase, additional firefighters with "fresh eyes" may join the search, which might not have been possible during the initial stages of the operation. Once both primary and secondary searches have been carried out with no victims found, an "all clear" signal is given. This indicates that all areas have been thoroughly searched, and no occupants are unaccounted for in the structure.

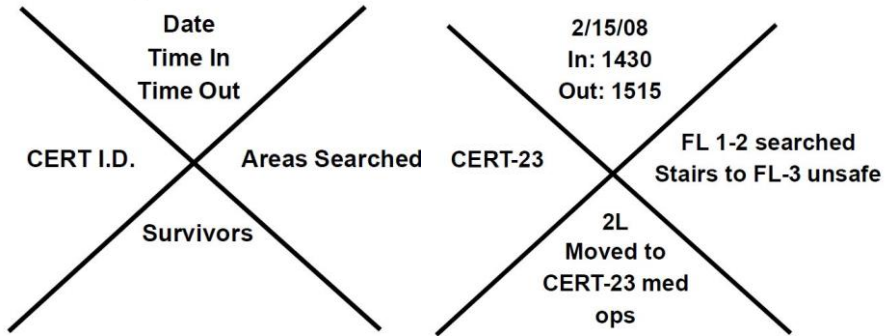


Search area markings

- The majority of fire departments employ a room or search area marking system that entail creating a single slash as an initial marker for search commencement, followed by a second line forming an "X" upon completion.
- These distinctive marks are typically positioned on the lower third of doors, walls, or in stairway landings. Within the "X," specific quadrants serve different purposes: the left quadrant designates the search unit or team, the top quadrant records the time of completion, the right quadrant indicates any identified hazards, and the bottom of the "X" is used to note the number of victims and their respective conditions.



Search area markings



Firefighter safety

- In order to maintain optimal safety, firefighters conduct searches by moving on their hands and knees or assuming a squat position. This positioning helps them maintain their orientation in the direction of travel and, in the event of being struck by debris, ensures they stay on the right path. Additionally, being closer to the floor level provides an advantage as it offers lower temperatures in case the fire conditions change.
- At times, firefighters take brief breaks while holding their breath to listen to their surroundings. During these pauses, they may hear various sounds such as a victim moaning, the creaking or crackling of structures, the fire itself, or receive updates through radio communication. Such moments of pause allow them to gain a better understanding of the overall fireground situation as well as the immediate search area.

PPE Examples



Safety glasses



Wildland goggles



Face Shield



Level C PPE with tyvek splash suit and APR respirators



Example of Leather gloves
Courtesy Kirkwood



Wildfire helmet



Example of Nitrile gloves
Courtesy Kirkwood



N95 Respirator



1/2 face APR



Full face APR



PAPR

Methods of rescue

- Once a victim is located, the methods for ensuring their safe rescue and removal can vary, ranging from sheltering-in-place to employing different carrying and dragging techniques. While it is crucial to handle victims with utmost care, firefighters must acknowledge that rescue situations might not be ideal for the patient, and not moving a victim could lead to further injury or even death.



Methods of rescue

- **Shelter in place:** If a victim is conscious and already in a safe area or can be moved to a protected area, a shelter-in-place approach might be considered. This decision is made by the commanding officer and allows for patient care, additional assistance, and controlled evacuation.
- **Victim assistance:** If a conscious victim can walk on their own, they may be guided to an exit with minimal or no assistance. In this case, accountability is crucial as firefighters must meet the victims at the designated exit and provide necessary care. Conscious victims can also offer valuable information if interviewed properly.



Methods of rescue

- **Carries:** Victims can be moved to safety using the seat carry or extremity carry. The seat carry is suitable for conscious patients who can hold onto the shoulders of two firefighters walking together, arms linked. The extremity carry can be used for both conscious and unconscious patients, involving two firefighters holding the victim's arms and legs while moving them to safety. This method is particularly effective in narrow hallways and door openings.



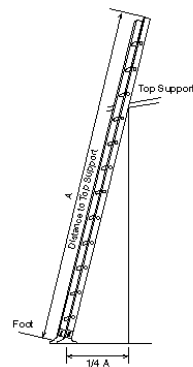
Methods of rescue

- Drags: The most efficient way to move an unconscious or unresponsive victim to safety is by dragging them. The blanket drag utilizes a blanket or salvage cover to assist in pulling the victim. It offers the advantage of being initiated by a single firefighter until additional help arrives.



Methods of rescue

- Ladder rescue: Removing a victim through a window and down a ladder involves considerable risk for both firefighters and victims. Proper technique, physical strength, and stamina are essential for this type of rescue, and it should only be attempted when all other exit options have been exhausted.



Mobile equipment

- As soon as a firefighter establishes contact with a victim, the victim is considered a patient. Rescue team members must possess vital skills to check for injuries and life-threatening conditions beyond the fire.
- In situations where an injury is confirmed, it is advisable to utilize a backboard, stretcher, or litter, as they are specifically designed to offer maximum protection and immobilization for the patient's safety. Patients must be carefully secured with their spine immobilized, and head traction should be supervised by a rescuer.

Rescue or recovery: a firefighter's dilemma

- A fundamental principle in risk/benefit analysis is that firefighters should not jeopardize their safety for a situation that cannot be salvaged. While caregivers and well-trained first responders naturally possess empathy and compassion, these emotions must be kept in check and directed appropriately.
- As professionals, firefighters must adhere to their training and education, adhering to safe and effective fireground practices regardless of their intent or desire. This principle applies to the search and rescue of potential victims as well.
- The most challenging task for a search and rescue team is recognizing when a situation is untenable. As time passes and temperatures rise in a structure engulfed by fire, the chances of a victim's survival decrease. Eventually, there comes a point in the fire's progression where rescue transitions to recovery. It is crucial for all firefighters to acknowledge and comprehend this certainty during fireground operations.



Thank you!