FIREFIGHTERS WATER RESCUE

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What we are going to learn.

• What is water rescue?
• Who should undertake water rescues?
• Self rescue
• Still/Static/Flat/Enclosed/Pool water victim rescue
• Swift water victim rescue
What is water rescue?

• Firefighter’s mission is to protect life and property. This places search and rescue operations at the top of the response priorities.

• Fire and rescue departments are called upon, with increasing frequency, to deal with water rescue emergencies.

• Water rescue is defined as rescue of a patient or a victim who is afloat on the surface of water body.
Who should undertake water rescue?

- Water competency means being able to anticipate, avoid, and survive common drowning situations, as well as being able to recognize and provide assistance to those in need. It includes water safety awareness, basic swimming skills, and helping others. Water competency includes having sufficient knowledge to be responsible for one’s own safety as well as the safety of everyone you are supervising.

- There is more to drowning prevention than swimming skills. Water safety is knowing about the water and the hazards in it and about having respect for the water.

- That is water competency for any water rescuer.
The Drowning Process

- Struggle (10-60 seconds)
- Ingest and aspirate water into airway
- Laryngospasm
- Hypoxia
- Laryngospasm relax, gasps water into lungs
- Unconsciousness
- Respiratory arrest
- Cardiac arrest (can occur as little as 3 minutes after submerging. Brain damage & death can occur in as little as 4-6 minutes)
Self rescue
Still Waters

• Do not panic (if you get worked up, you end up gulping water and in worse condition.)
• Turn on your back. Lay on your back and calm yourself down, keep your face out of water and keep breathing. Get some air in your lungs to help you float.
• When you are on your back, keep your head tilted a bit back. That head position will cause your legs to float to the surface or at least rise a little, showing how easily you can be buoyant.
• Try to get someone’s attention by waving your hands or yelling.
Skills will save you

• Learn how to swim

• Learn how to float and survive in water

• Learn to tread in water

• Wear a PFD when within 10 foot of water.
In Swift Waters

• There are two swimming modes: defensive swimming and aggressive swimming.

• Rescuers should be familiar with both methods. They can be used interchangeably. In addition, there is the barrel roll into eddies, back ferry and strainer drill which emphasize swift water swimming techniques.
Defensive Swimming

• In defensive swimming, the swimmer floats on back with feet on the surface and pointing downstream. This reduces risk of foot entrapment and allows the swimmer to defend them against smashing into objects.

• If the swimmer wants to move laterally or across the current, one rotates the body so that is no longer parallel with the current and uses arms to back paddle. Back paddling at an angle against the current executes the basic back ferry. Also, it slows the downstream movement of the swimmer.
Aggressive Swimming

• Aggressive swimming is the crawl stroke with the head up out of the water as much as possible so that the swimmer can see where she is swimming.

• When swimming, the emphasis is on pulling the swimmer through the water with the arms.

• Excessive kicking uses more energy than the propulsion it provides.
Barrel Rolls

The barrel roll is a technique used to help a swimmer break the eddy line and enter the eddy.
Caught in a Vehicle

1. Brace yourself for impact if you are the driver. Place both hands on steering wheel in the ‘10 & 2’ positions. Impact could set off airbag. Don’t brace yourself if you are a passenger putting head down or arms up could increase your chance of being injured in the crash.

1. Try to stay calm and act quickly. You only have 30-60 seconds to act before your car sinks below the water.
Caught in a Vehicle

- Seatbelts off, Window open or broken, Out (Children First) protocol

- It take about 60-120 seconds for a car to fill up with water.

- The car leans and starts to sink with the front heavier side first. You get caught up jump to higher backside and escape from there.

- Do not break or try to escape through the windscreen.
Victim Water Rescue
Is there a risk in undertaking a water rescue?

- You need to be trained in water swimming and rescue skills to attempt any water rescue.
- Many people lose their lives while attempting to save others.
- Often when you approach a person in difficulty they may be in a state of panic, and can easily drag you under in their attempt to stay afloat.
- It is important not to put yourself in danger; you can reassure the person while encouraging them to kick in themselves or lie on back, or if the person requires towing you can take an aid to them.
- Rescue Swimming refers to skills that enable an individual to attempt a rescue when a swimmer is in difficulty. These include a combination of communication skills, specific "rescue" swimming strokes, and release and evade techniques for self-preservation should the rescue go wrong.
• From the outset once a swimmer in difficulty is spotted, eye contact must be maintained at all times.
• Assess the situation: environment, available physical equipment, others who can help, etc.
• Attempt to establish voice contact, which if successful can often result in a "voice-rescue."
• A rescuer should enter the water only as a last resort.
• Rescues should be attempted in the following order: talk, throw, reach, wade, row, swim, tow and carry.
# Recognizing a drowning victim

<table>
<thead>
<tr>
<th>Head position</th>
<th>Appearance</th>
<th>Breathing</th>
<th>Arm and leg action</th>
<th>Body position</th>
<th>Locomotion</th>
<th>Sounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distressed Swimmer</td>
<td>Above water</td>
<td>Breathing</td>
<td>Floating, sculling or treading water</td>
<td>Horizontal, vertical or diagonal, depending on means of support</td>
<td>Little or no forward progress</td>
<td>Able to call for help but may not do so</td>
</tr>
<tr>
<td>Drowning Victim—Active</td>
<td>Tilted back with face looking up</td>
<td>Struggling to breathe</td>
<td>Arms at sides or in front alternately moving up and pressing down</td>
<td>Vertical, leaning slightly back</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Drowning Victim—Passive</td>
<td>Face-up or face-down in the water</td>
<td>Not breathing</td>
<td>Face-up or face-down</td>
<td>Horizontal or vertical</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

- Convulsions-like movements
- Floating or submerged
- Eyes may be closed
- If submerged, may look like a shadow
What should I do if someone is in drowning?

The 4 A of Rescue

Awareness
Assessment
Action
Aftercare
Rescue safety checklist

1. When performing a reach rescue, sometimes the person in trouble won’t realise you are offering help. If this happens make contact by resting the aid over the person’s shoulder.

2. If you join a person in the water, instruct them from an arms length away.

3. If attempting a throw rescue, using a buoyant aid will give the swimmer in difficulty support until they are removed from the danger area.

4. Examples of rigid aids could include, branch, stick, umbrella or paddle.

5. Examples of non rigid aids could include a towel, rope, clothing or waist belt.
Victim Rescue Sequence

• **Talk**
Calm the victim, give instructions on how to save himself/herself.

• **Reach**
Arm reach or leg reach when the victim is close.

• **Extension/Throw**
Extend to the victim an item you can use to pull to safety e.g. rake, branch, stick, rod, baseball bat, rope, waist belt, clothing like trouser, shirt.
Throw an object that floats to the victim e.g. kickboard, lifejacket, ring buoy, basketball, water jag, empty picnic cooler, inner tube.

• **Go**
Only if you are a trained in water rescue.
Swim Test/Competency

• Distance swim – 25 yards/25meters.
• Floating/treading water – 1minute.
• Perform swim strokes, e.g. swim on front or back
• Duration swimming – 1-5minutes.
• Breath control techniques – require face submersion
• Demonstrate rescue techniques e.g. reach or throw.
• Perform under different water conditions e.g. rivers vs. pool
Water competence must include proficiency in skills and includes the following water conceptual water safety categories

1. Entry with total immersion
2. Recovery to the surface and remain there for at least one minute using floating or treading
3. Change body orientation allowing repositioning, turning at least 180 degrees and facing toward an exit direction.
4. Propulsion including leveling off and moving on front and/or on back position.
5. Exit from water.
Furthermore the water competence is influenced by conditions of the aquatic environments (e.g. water temperature, clarity, waves and current action, depth, distance) into which the person may be introduced.

It also is influenced by specific task demands such as what clothing and other equipment an individual may be wearing or using.

As a consequence of the influence of task and environmental factors on aquatic performance, demonstration of aquatic skills in one aquatic environment (e.g. pool) may not transfer to another (e.g. open). The implication for this awareness are the firefighter/rescuer should be exposed to different environmental conditions (e.g. colder water, simulated waves) and tasks demands (e.g. swim clothed)
When things don’t go as Practiced

• A drowning victim may grab you trying to stay afloat.

• Training in Self Preservation maneuvers like;
  ✓ Hand or leg grip release and evade
  ✓ Front Head-Hold escape
  ✓ Rear Head-Hold escape
Swift Water Rescue

- Definition:
  Technical rescue involving fast moving water conditions.

  It applies to any rescue situation in an environment with moving water.
Qualifications standards of swift water.

✓ Water depth of over 2 feet.

✓ Flow rate of, at minimum, one knot (1.15 miles/hour, 1.85 kms/hour)

✓ Occurrence in a natural water course, flood control channel or flood-affected environment.
Swift Water Hazards

• Flowing water is deceptively strong, surprising many unwary victims.

• Fresh water moving at only 5km/hour, a brisk walking pace, exerts a force about 26kgs on each square foot of anything it encounters. Double that to 10kms/hour and the force skyrockets to about 120kgs per square foot. That’s enough force to easily push a car or light truck off a flooded road if the level is up to door level.
Swift water Hazards Cont.

**Cold Water**

Direct exposure to cold water quickly robs a person off heat and can lead to hypothermia (body core temperature falls below 98.6°F/37°C).

Body heat can be lost 25 times in cold water than in cold air.

Hypothermia affects the body’s core - the brain, heart, lungs and other vital organs. Even a mild case of hypothermia diminishes a person’s physical and mental abilities, thus increasing the risk of accidents.

The ‘cold shock’ response is a physiological reaction that occurs during the first 3-4 minutes of cold water immersion. This precipitates a peripheral vasoconstriction, the gasp reflex, hyperventilation, and tachycardia.

Some reported drowning victims do not die because of poor swimming skills or the effects of hypothermia, but from the ‘cold shock’ response. Occasionally the gasp reflex causes the victim to inhale water. A person can also die from cardiac arrest brought on by sudden entry into cold water.
Swift water Hazards Cont.

- Low head Dams
- **Entrapments** (entire body forced into a crack, clavicle or undercuts)
- **Strainers** (obstacles)
- Culvert openings
- Flood control channels
- **Low-water crossings** (bridges, crossing logs)
- Flood debris
Hazards can also be classified as;

- **Dynamic Hazards**
  (objects moving in water)
  - Vehicles
  - Trees
  - Animals
  - Clothing

- **Static hazards**
  (Stationery objects)
  - Signs, poles and Fire hydrants
  - Manholes
  - Guard rails, Fencing & barbed wires
  - Structures
  - Utilities like power lines

- **Environmental Challenges**
  - Weather and season
  - Accessibility
  - Time of day, poor visibility & darkness
  - Personnel & Equipment resources
  - Number of victims
  - Potential crime scene
Hazardous Materials/Biological Hazards
Water may contain various chemicals and biological waste products. This may be the result of saturated ground, the overwhelming of sewerage and septic systems, or industrial run-off.

Flood water should always be considered contaminated and dry suits shall be worn to protect.

Gross decontamination should be performed after each entry.

Completion of exposure reports are recommended for all entries into flood waters.
In Swift Waters get to know of:

- Eddy
- Eddy Fence
- Pillow
- Helical Flow
- Laminar Flow
- Current Flow
- Downstream
- Upstream
- Frowning Hole
- Smiling Hole
- Boiling Line
- Hydraulic Effect
Swift water Rescue Principles

1. Priorities for rescue are always- Self, Team, and the Victim.
2. Wear PPE (minimum of a PFD) within 10 feet of swift water.
3. Keep the rescue plan simple- complexity increases the chance of failure.
4. Plan for contingencies- have a back up plan.
5. Deploy multiple downstream rescuers (trained technicians)
6. Deploy upstream spotters (watchers can be untrained)
7. Do not stand inside the rope bight or on downstream side of tensioned line.
8. Don’t directly tie a rope to a rescuer. (use quick release harness, ring)
9. Don’t put your feet down in swift water deeper than your knees.
10. Don’t tension a line 90 degrees to the current.
11. Once a victim is contacted, don’t lose them.
12. Be proactive, don’t count on victim to aid in their own rescue.
Swift water Rescue Pre-Plan

   Physical features, specific hazards, landing zones

2. Equipment.

3. Training.

4. Established procedures.
   Formal written plan addressing rescue operation.
Operation Risk Management (ORM)

1. Accept No Unnecessary Risk.
3. Make Risk Decisions at the Appropriate level
4. Integrate ORM into Operations and Planning at all levels.
ORM includes the following Seven steps:

1. Identify mission tasks.
2. Identify hazards.
3. Assess risks.
4. Identify options.
5. Evaluate risks versus gains (benefits outweigh potential cost).
6. Execute decision.
7. Monitor situation.
Risk Assessment & Management

• The low-to-high risk algorithm for swift water rescue reflects the increasing level of personal exposure to risk by rescuers based upon the method of rescue.

• Previously this read ‘reach-throw-row-go-hello.’ However it has been updated to reflect the increased safety of helicopter operations and the increased death of rescuer in boats.

• Keep in mind that no algorithm reflects an absolute rigid means of how swift water rescue is to be performed. Every incident is unique and involves numerous factors.
Swift water Communication

• The noise of moving waters and probably helicopter may prevent effective communications between rescuers.

• Radio may not always be practical for rescuers in water

• Hands and Whistle signals provide a simple form of communication.
Whistle

1 blast - Stop and Look
2 blasts - Up (upstream)
3 blasts - Down (downstream)
4 blasts - Okay, Off Rope
Hand Signals

• **Distress/Help** - One hand held above head.

• **Okay** - Hand tapping head or create ‘O’ with both hands

• **Move/Swim** - Two hands up, wave then point.

• **Need Medical help** - Both arms crossed at chest.
Stranded Vehicle Rescue Operation

• Half of all fatalities are vehicles related.

• As little as Six inches of water will cause loss of car control.

• Two feet of water will carry most cars.
Stranded Vehicle Rescue Operation

• Quick assessment of the situation and rescue site is imperative.

• The vehicle’s stability may depend on type of surface it is sitting on. Concrete, sand, or rock surfaces will affect the vehicle stability differently.

• If a vehicle tumbles, escape may become impossible and is hazardous to the rescuer, whether the victim is still inside or has escaped to the roof, the weight of the passenger may be all that is keeping the vehicle from being swept away.
Stranded Vehicle Rescue Operation

• A shallow water crossing.

• Continuous loop technique.

• Simple two point or

• Four points boat tether

Are methods necessary to recover the victim.
Whichever rescue technique is used, the rescuer should be aware of the following:

- Never approach a vehicle from upstream side to perform a rescue, you could get pinned against the vehicle or worse get sucked underneath the vehicle and become pinned to the undercarriage.

- Approach from the downstream side of the vehicle, there is usually an eddy created by the vehicle. Be aware though that the eddy on a vehicle rescue is not the safest place it normally is out in the river, although it is the calmest and safest place to be in a vehicle rescue.
The End

Thank You!