

RNLI STANDARD OPERATING PROCEDURE



Rescues Involving Mud

Validation

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Objective

To ensure the safest and most effective approach to rescues involving mud, unstable ground or quicksand.

Reference Documentation

Crew Handbook
Flood Rescue Manual

Checklist

Sop read and understood?	<input checked="" type="checkbox"/>
Team briefed?	<input type="checkbox"/>
	<input type="checkbox"/>

Hazards

Mud	Entrapment
Quicksand	Rising tide
Suffocation and ingestion of mud	Unseen sharps
Drowning	Contamination and pollution
Heat exhaustion	

Health and Safety

					
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Scope

This SOP uses the term 'Mud Rescue' to describe any rescue involving soft mud, soft or running sand or quicksand.

Mud and quicksand represent a significant potential danger to rescuers. Mud and quicksand rescues need to use specialist equipment. Therefore normally only Hovercraft stations will undertake mud rescue with specialist training.

For Lifeguard and flood operations, Make sure specialist teams are called in and ideally briefed on the current situation, including the tidal state. You can use rescue boards or the flood rescue sled as a makeshift rescue platform.

If your beach or station area has mud or quicksand please refer to your LOP (Local Operating Procedure) for guidance on preventative and emergency actions.

Once the casualty has been located, there are three phases of 'mud rescues'.

These are Access, Extraction and Recovery:

- Access – appropriately equipped team effecting access to the casualty
- Extraction – freeing the casualty from their 'stuck' position
- Recovery –of the casualty, crew and equipment to the shore or safe haven

Becoming Trapped in Soft Ground

The effect of becoming trapped in soft ground is that when the person tries to pull their legs free, they create a vacuum underneath their feet and around the leg which prevents escape and further movement can make the situation worse. In quicksand the area around the legs becomes very solid. One immediate measure that can be taken to prevent the casualty sinking further is to sit on the surface of the mud/quicksand, thus spreading the load this may reduce further risk to injured casualties.

Access

- With the location of the casualty identified, access to the casualty shall take the safety of the crew, casualty and the IRH into consideration
- On approaching the casualty, if there is any difficult terrain, debris, slopes etc. the IRH shall be stopped in a 'safe' location and a dynamic risk assessment made of how to proceed
- If the casualty is 'stuck', the approach chosen shall always allow a route away from the casualty without the need to pass over the spot where the casualty is. Consideration should also be given to mud/sand/spray
- The hovercraft should be shutdown when next to the casualty as vibration may cause a bigger area to be affected i.e. turns to quicksand
- Assess the **casualty and, should it be deemed necessary, put a survivor's lifejacket on them**

Extraction

Extraction from Soft Silty Mud

- In most cases, the ability to put weight on a mud mat, mud board, hovercraft skirt or a hand from the IRH crew, will enable the casualty to pull or be pulled out of the mud and onto the IRH. The first step is therefore to deploy mats and/or boards as shown in figures 1 and 2 below.



Figure 1



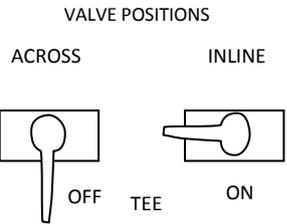
Figure 2



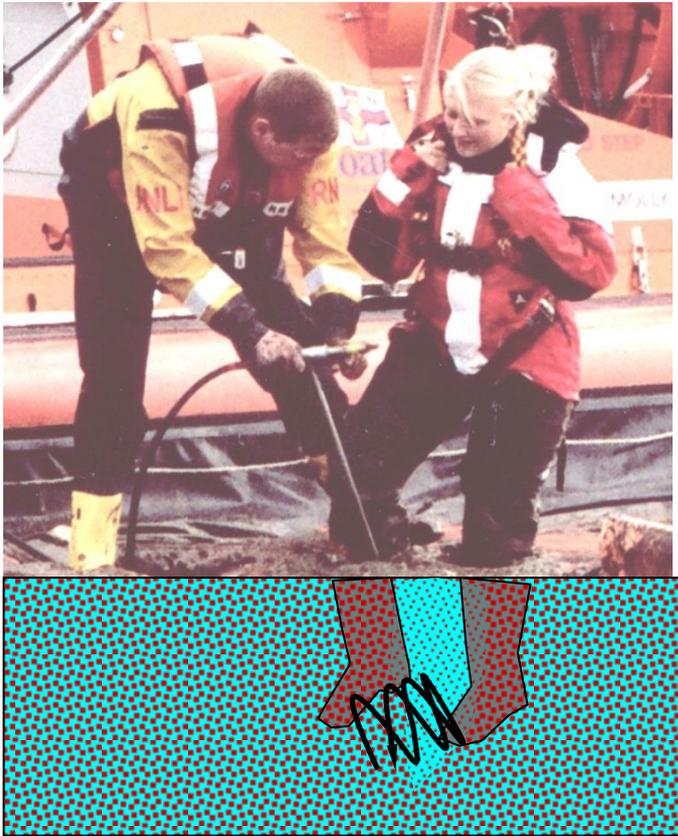
Figure 3

- Lay the first mud mat at 90° on the skirt, lay the stretcher at 90° to the skirt, this will form a 'U' shape from the hovercraft. Lay the second mud mat at 90° to both the stretcher and the first mud mat, this will make a box around the casualty
- On reaching the casualty and having provided something for the casualty to sit on or transfer weight to, work on freeing one limb at a time (See figure 3 above)
- Lines from the mud mats shall be attached to the hovercraft skirt. This will aid recovery.
- Correct use of the lance
- If you cannot extract the casualty manually, it may be necessary to use the mud lance to aid extraction
- The casualty is to be secured against further sinkage before the equipment is used. This may involve the use of the 'A' frame and strop, or sitting the casualty on a mud mat or seat base (See A Frame SOP)
- Remove the lance, bottles and hoses from their stowage
- Ensure that control valve on the lance is in the "off" position when making any connections.
- Connect the hose supplied to the extinguisher/air bottle and the lance
- Insert lance close to the trapped casualty ensuring the lance tip is as close to the casualty's feet as possible

- **Note: Never place yourself in danger from the risk whilst using this equipment. Operate from a safe position (from the removable seat covers or the mud mats)**
- The gas/water extinguisher or air bottle must not be activated inside the hovercraft
- Crew should use helmet visors to protect their eyes and a barrier should be put between possible sources of spray and the casualty's eyes/face before discharging water/air cylinders



- The extinguisher/air bottle can now be activated in the conventional manner
- Ask the survivor if they know the position of their feet. A survivor will lose sensation very quickly in the areas of their body that are trapped
- The supply valve on the lance is then opened slowly this supplies the water/air to the lance tip
- The lance shall then be carefully moved around the casualty in the mud (or sand and water saturated standing). The water/air injected into the area as shown in the picture below will liquefy/aerate the substance trapping the casualty making extrication easier



To disconnect the water supply hose from the lance when the extinguisher has water and gas under pressure remaining in it:

- Keep the lance valve open
- Release the squeeze grip of the extinguisher
- Remove the hose from the lance and then discharge the extinguisher in the normal way if no longer required

To disconnect the air hose from the lance:

- Keep the lance valve open
- Shut off the air supply at the bottle, (note this on the regulator valve)
- When all air is purged from the lance the hose may be disconnected

Refilling the extinguisher

- Remove the top of the extinguisher by unscrewing it
- Fill the extinguisher with water, up to the indicated mark on the dipstick
- Remove the used CO2 cylinder and replace with new
- Screw the top of the extinguisher back on so that it is ready for use

Cleaning

Note: No oils or greases are to be used on any part of the compressed air bottle.

- The lance and its ancillary items must be cleaned after use, this must be done with clean fresh water
- Following any contamination such as slurry etc the equipment needs to be decontaminated using a disinfectant solution
- Recharge the extinguisher/air bottle as necessary and ensure all equipment is dry before restowing

Extraction by digging

Digging is self-explanatory. However, considerable care should be exercised when working close to the casualty. It is likely that the casualty will be partially numbed by cold and/or pressure, and may not feel any contact with a digging tool. Serious injury may be caused that would not become apparent until the condition of the casualty abruptly worsens, or once evacuated and cleaned up.

Extraction from quicksand

Do not use the mud lance without the casualty being properly supported.

If the casualty cannot easily be recovered because of solidification above the trapped limb(s) or suction below the trapped limb(s) then the mud lance should be deployed.

The mud lance used with water injection will assist by liquefying compacted mud/sand and when used with air, will help relieve suction. In either case, ground conditions will be altered and will increase the risk of sinking further. This may be alleviated by sitting the casualty down onto a mud mat/board or hovercraft skirt or by fitting a harness to the casualty, suspended from the IRH "A" frame. See SOP 8-8-03 - "A" Frame and Ancillary Equipment.

Recovery

Once extracted, the casualty will require prompt evacuation. In all but the most minor cases the casualty should not be allowed to walk. Sudden release and attempts to stand may induce post rescue collapse with possible fatal results. For this reason, the casualty should be evacuated on a stretcher or seat base in as near as horizontal position as possible and wrapped in a blanket and/or bag to prevent further heat loss.