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CONFINED SPACE RESCUE

At any incident the use of Confined Space Equipment or Rescue procedures must be used in accordance with the organisation's pre-defined Standard Operating Procedure

1. USE OF EQUIPMENT

1.1 All equipment is to be used with either Full Fire Kit or the specialist Rope Rescue PPE.

1.2 Equipment is carried in two Bags:

1.2.1 BAG with Initial Safety Rope System

The contents of this bag are designed to allow a person to enter the risk area safely and to provide a means of emergency recovery if required.

2 x Full Body Harnesses

1 x Shock Absorbing Lanyard

1 x Gri - gri

1 x Rope (50 metre)

2 x Pulley P50

2 x Round Sling

1 x Croll

1 x Komet Stick Run

1 x Roller Module

1 x Rescue Strop

6 x Carabiners

2 x Prusik Lines

1 x PVC Line Protector

1.2.2 BAG (Casualty Stabilisation)

The contents of this bag are designed to provide for the stabilisation of a casualty and to prevent a further fall, or where the casualty is in danger of becoming submerged in a liquid or a free flowing solid.

1 x Rope (50 metre)

3 x Carabiners

1 x Rescue Strop

1 x Round Sling

1.3 **GOOD COMMUNICATIONS ARE AN ESSENTIAL ELEMENT IN THE USE OF CONFINED SPACE EQUIPMENT AND PROCEDURES.** Always ensure a suitable and effective method of communication is used at all times.

2. INITIAL ACTIONS

2.1 Action of First Fire fighter to Enter the Risk

Their responsibilities are to:

- 2.1.1 Reach and secure the casualty
- 2.1.2 Render First Aid as appropriate
- 2.1.3 Stabilise the situation and await further assistance
- 2.1.4 Assess the situation for subsequent casualty rescue

2.2 Action of Crew Members

In consideration of the nature of Confined Space / Rope Rescue activities all personnel involved are responsible for ensuring that:

- 2.2.1 Suitable and safe anchorage points are used for belays.
- 2.2.2 Due regard is given to the potential hazard of abrasion on rescue ropes at contact points and suitable provision is made for rope protection using the line protector or roller module.
- 2.2.3 Any potential hazards within the site of operations are identified. Particular attention should be paid to:
 - 2.2.3.1 The route (line) to be used by the first member of personnel entering.
 - 2.2.3.2 Loose surface materials.
 - 2.2.3.3 Sharp edges and projections.
 - 2.2.3.4 In industrial locations, to hot surfaces, steam vents, power lines, etc.
 - 2.2.3.5 The evacuation route is identified and secured.
- 2.2.4 In the event of electrical hazards being identified, confirmation of safe isolation is received before rescue operations commence.

3. EQUIPMENT

3.1. Full Body Harness.

The Harness will provide the rescuer with the appropriate PPE to enable an entry into a Confined Space to be made with the required level of restraint.

A Dorsal Anchorage is fitted for use when negotiating vertical access points.

A Sternal Anchorage is fitted for use when operations are conducted which require Work Restraint techniques.

3.2. Kermantle Static Rope.

11 Millimetre Diameter Rope.

50 metre length.

3.3. Self-braking belay device (e.g. Gri-Gri).

Used to secure a line to an anchorage and allow a controlled movement with the device acting as a self-locking belay.

3.4. Pulley.

A Pulley with pivoting side plates which allows a rope to be rove. Used in rope deflection points and in the set up of an Emergency Recovery Hauling System.

3.5. Round Sling.

A Sling used for securing to an anchorage or deflection point. A Larks foot placed in the sling will reduce the Safe Working Load by 50%.

The sling should be protected from damage by Heat and Sharp edges at all times.

The sling must not be used for any other purpose than that which is detailed in this procedure

3.6. Croll

A piece of equipment which in this application is used to secure the Emergency Recovery System to the main rope.

3.7. Roller Module.

A roller conduit for rope that allows free passage over edges that would abrade it. This module must be secured in place.

3.8. Carabiner

A connector for attaching equipment together or to an anchorage. Screw gates must be locked when in use.

3.9. Rescue Strop.

An adaptable Rescue Strop for casualty securing or rescue dependant upon injuries. Complete with adjustable chest harness and independent leg loops.

3.10. Rope Protector.

A sheath used to protect the rope at abrasion points. The protector can also be used to shield Round Slings at anchorage points.

3.11. Komet Stickrun.

A fall arrest device, which allows a person to ascend or descend a vertical safety rope. Connected to the Sternal attachment of the harness. The Stickrun has a Safety Catch and Screw Thread Lock, both of which must be engaged before operation.

Descend Mode (Lever Up)

When operating in this mode, the spring-loaded lever should be locked in the Vertical position as shown above. This will enable the Stickrun to freely descend the safety rope as the operator travels down. Should a fall occur the device will grip the line and arrest the fall.

Ascend Mode (Lever Down)

When operating in this mode, the spring-loaded lever should be locked in the Horizontal position as shown above. This will enable the Stickrun to ascend the safety rope as the operator travels upwards. Should a fall occur the device will grip the line and arrest the fall.

3.12. Breathing Apparatus Support Sling.



A purpose made sling used to support a Breathing Apparatus Set where Vertical Entry through a restricted opening is not possible whilst wearing a Breathing Apparatus Set.

3.13. Shock Absorber.

Shock absorbing device that ensures the impact load in a fall arrest situation does not exceed 6kn. A Shock absorber must be placed into the system on every occasion that personnel are working in a fall-arrest situation.

4. Belays and Anchor Points

- 4.1 A sling must be used to belay ropes on structural steel work or anchorages on any structure (*The ideal position for an anchorage point is about 3 metre away from the access point with no obstructions between the anchor point and entry point*). The rope must not be tied directly to the anchorage point
- 4.2 In the event that it is necessary to use natural anchor points, the following guidance should be applied:
 - 4.2.1 Trees should be at least 300mm diameter and in an apparently healthy condition
 - 4.2.2 Boulders should be in a stable position and of size not less than 1.5m cube.
 - 4.2.3 Vehicles should only be used as an anchor point when they are in a stable location away from the danger area. The vehicle must be left in gear, with the handbrake applied and the wheels chocked. The vehicle must be locked and the responsible person supervising access to the confined space will hold the keys.
- 4.3 Personnel should be aware of the effects of leverage on any anchor point, for example, if belaying to a tree. The belay should be as close to the ground as possible to reduce the effects of leverage.
- 4.4 Anchorage points may be difficult to locate when operations are carried out aloft in such situations as a silo. In these situations it may be necessary to utilise an Aerial Appliance. If this option is utilised SAFE WORKING LOADS MUST BE ADHERED TO.

5. Gaining Access into Confined Spaces.

5.1 Scenarios.

- 5.1.1 Access for Casualty Rescue / Casualty Stabilisation.
- 5.1.2 Access for Firefighting related actions
- 5.1.3 Access with Breathing Apparatus Set Removal

5.2 Access for Casualty Stabilisation.

The use of Confined Space equipment in this sphere will be utilised for the Access of Firefighters to enable stabilisation of casualties. Breathing Apparatus wearers will descend to gain access via Vertical ladders, Step Irons or Fire service ladders utilising Confined Space equipment as a safety backup.

Personnel will not be lowered into a Confined Space utilising this equipment for Casualty stabilisation.

THE ONLY EXCEPTION TO THIS IS FOR PERSONNEL WHO ARE SPECIFICALLY TRAINED IN SPECIALIST ROPE ACCESS AND RESCUE SKILLS.

Personnel can, when at a level where no further fall or danger of submersion is possible disconnect from the safety system, providing that they are working as a minimum in teams of two. This will ensure that Emergency Recovery of personnel is possible.

Normal Breathing Apparatus procedures and Entry Control Procedures MUST be adhered to at all times.

5.2.1 Stabilisation of the casualty will consist of -

- 5.2.1.1 Securing the casualty into the Rescue Strop thus preventing further fall or being submerged in fluid or a free flowing solid. The casualties' injuries must be considered with regards to the use of a Rescue Strop. The Rescue Strop must be secured to the rescue rope, not to the front anchorage of the rescuer's harness (*If the casualty suffers a fall whilst secured to the front anchorage, this will result in severe injury to the rescuer*).
- 5.2.1.2 Render First Aid and Resuscitation as necessary.
- 5.2.1.3 Assess the situation for casualty rescue. Once the casualty is stabilised consider whether a vertical haul will be necessary utilising the additional equipment.

5.3 Firefighting related actions.

The use of Confined Space Equipment in this sphere will be limited to gaining access at a location, which is remote from the fire, associated heat or hot steelwork. Breathing Apparatus wearers will descend to gain access via vertical ladders, step irons or by the provision of a fire service ladder utilising Confined Space Equipment as Personal Protective Equipment.

Personnel will not be lowered into a Confined Space utilising this equipment. THE ONLY EXCEPTION TO THIS IS PERSONNEL WHO ARE SPECIFICALLY TRAINED IN THIS METHOD OF OPERATION.

Personnel can, when at a level where no further fall is possible disconnect from the safety system, providing that they are working as a minimum in teams of Two. This will ensure that Emergency Recovery of personnel is possible.

Normal Breathing Apparatus procedures and Entry Control Procedures MUST be adhered to at all times.

- 5.3.1 The Dorsal Anchorage of the harness should then be secured over the Left shoulder utilising the stitched loop and Velcro attachment. This action will ensure that the Dorsal Anchorage will be immediately available when vertical egress is required.
- 5.3.2 Subsequent team members that are required to descend will attach to the safety rope utilising the Komet Stickrun and Sternal Anchorage point.



5.4 Access with Breathing Apparatus Set Removal.

5.5 In certain circumstances it may be necessary to gain access to a Confined Space where entry is not possible wearing a Breathing Apparatus Set in the conventional manner.

5.5.1 In such circumstances the following controlling criteria must exist-

5.5.2 Exceptional circumstances where immediate life at risk situation exists.

5.5.3 Fully Qualified Specialist Rope Rescue Operators utilising Two Line working procedures will conduct entry.

5.5.4 Full Confined Space / Rope Rescue support available.

5.5.5 **All other Rescue Options have been exhausted.**

6. Breathing Apparatus Set Support Sling.

Stage 1.

Package the Breathing Apparatus Set to its minimum size. Secure the Breathing Apparatus Sling to the Breathing Apparatus Set as shown below.



Packaging and supporting the Breathing Apparatus Set in the manner shown, will ensure that the Distress Signal Unit, Contents Gauge and Cylinder Valve are all within the operators reach.

Stage 2.

Using the Croll secure the Support Sling to the main rope approximately 200mm from the Figure of 8 knot.

The height of the Breathing Apparatus set in relation to the wearer is adjustable by moving the Croll up or down as appropriate.

Secure the remaining carabiner to the Dorsal Anchorage of the harness.

Stage 3.

Gaining access with the Breathing Apparatus Set suspended must be undertaken utilising Two-line working. This is achieved by securing an additional safety rope into the system. The second rope will be used as a Safety Back up. It is secured to the harness at the Dorsal anchorage.



Stage 4

A safety backup must be in place for the Breathing Apparatus Set. This is achieved by the use of a Prusik knot tied on the Safety line, connected to the Croll on the Main line by utilising a carabiner. The Prusik knot must be kept in a position higher than the Croll to prevent the Breathing Apparatus Set from dropping should the main line fail.



7. Initial Safety Rope System

7.1 Emergency Recovery of personnel is primarily concerned with the removal of Fire Service personnel from the risk area should the situation deteriorate beyond the existing control measures or personnel suffer injury-necessitating withdrawal.

7.2 Initial Safety Rope System set up

- 7.2.1 Secure the Gri-gri to a suitable anchorage point using a Round Sling, Carabiner and Shock Absorber.
- 7.2.2 Ensure the anchorage point will sustain the expected load.
- 7.2.3 Protect the Round Sling from any sharp edges as appropriate.
- 7.2.4 Open the Gri-gri and load the safety rope. Close and lock the Carabiner.
- 7.2.5 Ensure the direction of load is correct. Refer to the pictogram on the body of the Gri-gri.

- 7.2.6 Two checks of the Gri-gri loading must be made prior to operation.
- 7.2.7 Secure a Figure of 8 knot in the end of the line and attach it to the Dorsal or Sternal Anchorage of the harness using a Carabiner.
- ◆ **Dorsal Anchorage - When negotiating Vertical risks.**
 - ◆ **Sternal Anchorage - When Work restraint is required.**
- 7.2.8 If access to a shaft, silo or similar location is to be made. Run the rope through a Pulley, which is secured, to a deflection point above the opening.
- 7.2.9 If no deflection point is available above the access point, utilise the Roller Module as necessary. This will protect the line as it passes over an edge.
- 7.2.10 IT IS IMPORTANT TO ENSURE THE SAFETY ROPE IS AT ALL TIMES FREE FROM SLACK TO ENSURE ANY FALL IS KEPT TO A MINIMUM.

8. Work restraint

The equipment will be used to allow for the safe positioning of personnel who need to work in a position of danger. **IT SHOULD NOT BE USED AS A MEANS OF LOWERING.** The equipment should only be used to allow personnel to be positioned where they are able to perform the task given without danger of falling:

8.1 Possible areas of use

- 8.1.1 Quayside or Riverside
- 8.1.2 Bridge or Gantry
- 8.1.3 Embankment or Slope
- 8.1.4 Mud Flats
- 8.1.5 Cliff Edge (*Any work required over the edge of a cliff is a rope rescue incident that requires the full specialist rope rescue attendance*).



Normal movement of the body will apply and release the weight on the locking cam. This will cause the line to creep. To prevent this occurring simply place a Figure of 8 knot in the line and secure it to the anchorage system. Securing must be to the carabiner on the Gri-gri side of the Shock Absorber.

Do not secure it to the carabiner on the anchorage point side of the Shock Absorber as this may hinder the deployment of the Shock absorber.

Suicide Intervention.

The equipment can be used to secure a person who is in a position of danger (potential suicide), by using a second line and rescue strop from the Casualty Stabilisation Pack secured to an independent anchorage point.

9. SYSTEM OPERATION

- 9.1 To allow the rope to pay out the Gri-gri will be held in the palm of the hand using the strength of One finger only, thus allowing the rope to feed through.

IT IS AN ESSENTIAL SAFETY REQUIREMENT THAT ONLY ONE FINGER IS USED TO OPERATE THE CAM.

This finger must be positioned in the area between the feed and return of the rope (As shown below). Should a fall occur, the operator would not be able to hold open the cam with one finger. The Locking Cam inside the Gri-gri will then grip the rope, arresting the fall.



- 9.2 Once a continuous load has been applied to the Gri-gri, the cam will remain in the locked position.

BEFORE THE CAM IS RELEASED TO ALLOW FURTHER TRAVEL - THE OPERATOR OF THE GRI-GRI MUST ON EVERY OCCASION ESTABLISH THE REASON WHY THE CAM OPERATED.

To unlock the cam the operative, to whom the system is affording protection, can simply step up using the primary means of access, releasing the cam.

- 9.3 Should an unwanted and unexpected fall occur, using the available communications establish the condition and position of the person to whom the system is affording protection.

BEFORE THE CAM IS RELEASED TO ALLOW FURTHER TRAVEL - THE OPERATOR OF THE GRI-GRI MUST ON EVERY OCCASION ESTABLISH THE REASON WHY THE CAM OPERATED.

This will allow the Gri-gri operator to ascertain the course of action required.

- 9.3.1 If the person to whom the system is affording protection is able to continue unaided allow them to regain their footing, then release the cam on the Gri-gri.
- 9.3.2 If the person to whom the system is affording protection is not able to continue unaided you can either lower them or haul them from the incident.

9.3.3 The Firefighter can be lowered to safety, but if a Firefighter is lowered **consideration MUST ALWAYS** be given as to how they will be subsequently removed from the lower level. Lowering and subsequent rescue will take a considerable time. Consideration must therefore be taken of how much air remains within their Breathing Apparatus set.

The Gri-gri operators first action should be to hold the rope over the Gri-gri body

The rope which is held over the body of the Gri-gri acts as a secondary brake, the more tension on the rope the slower the rope will run.

Next utilising the handle gently pull backwards allowing the rope to run through the Gri-gri.



Should the rope pass through the Gri-Gri too quickly, two actions are available to the operator.

Firstly, pull down on the spare line in the direction of the anchorage point.

Secondly, release the handle, which is holding the locking cam open. The releasing of the handle will automatically cause the cam to lock the rope and prevent any further travel of the rope.

9.3.4 The Fire fighter can be hauled to safety using the Emergency Recovery System.

10. Emergency Recovery System.

- 10.1 The standard method of Emergency Recovery is to adapt the Initial Safety Rope System to incorporate a 3-1 Hauling System. This Hauling advantage will allow the person to whom the system is affording protection to be easily recovered from the risk area.



- 10.2 Attach the Croll to the main part of the rope as near to the Pulley as possible, this will give you the longest haul available.
- 10.3 Attach a Pulley to the Croll using a carabiner, through this pulley is rove the return rope from the Gri-gri. With the Gri-gri employed as a self-acting belay, you now have a 3-1 advantage hauling system (*As shown*).

11. Casualty Strop Rescue

A strop rescue will only be carried out in circumstances where it is appropriate to the casualty's injuries. Casualty trauma assessment must be carried out to warrant this method of rescue. The vertical rescue by strop will be conducted by the Rope Rescue Attendance who are fully equipped and trained in hauling systems.

12. Casualty Stretcher Rescue

A stretcher rescue will be required if it is suspected that the casualty has sustained spinal trauma. Stretcher rescues will be conducted by the Rope Rescue Attendance who are fully equipped and trained in stretchers and hauling systems. Casualty trauma assessment must be carried out to warrant this method of rescue. The primary stretcher for use in Confined space Incidents is the body splint type (Troll Evac or similar)

At any incident the use of Confined Space Equipment or Rescue Procedures must be used in accordance with the appropriate Standard Operating Procedure