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IED DISPOSAL

Standard Operating Procedures (SOPs)

AMMENDMENTS

This amendment record is to be completed for each formal amendment to these SOPs. Formal amendments can only be authorised and implemented by the Operations Manager (with advice from the Capability Group as required)

Version	Amendment	Date	Amended By
v.3	Version produced following external review by Artois Ltd. Various changes, for detail see report (available from Capability Group)	3 Aug 18	NT
v.3	Added: Additional referral requirements (specific EOD actions) Annex G: IEDD support to mechanical operations	24 Sep 18	NT
V.3	Added (ground himself for a minimum of 5 seconds) in Annex B "Static Precautions".	18/11/18	JV
V.3	Safety distances updated	Jan 19	JV
v.31	Update following review in Iraq	Jan 19	NT
v.311	Minor clarification of safety distances	Jun 19	NT

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Introduction

This SOP details the procedures to be adhered to when conducting Render Safe Procedures (RSPs) by HALO Humanitarian Improvised Explosive Devices (HIEDD)¹ Operators. Due to the nature of IEDs the exact make up of a device will vary and be unknown to the EOD operator prior to disposal; therefore the exact nature of the RSP will vary from device to device. As such this SOP will offer guidance on the technical approach that an operator should adhere to, and guideline procedures for common individual device types.

It should be read in conjunction with HALO Global EOD SOPs, and parts 1,2 & 3 of HALO Global IED SOPs (Task Management, Survey and Manual Clearance), particularly the sections detailing the guiding aim, philosophy of HIEDD. This part of the SOP is to be applied to devices identified during planned clearance operations (either manual or mechanical) as outlined in part 3 & 4 of HALO Global IED SOPs. Responding to an IED spot task requires a bespoke response and must be discussed with the Operations Manager prior to deployment².

There may be IEDs that present an obvious high level of complexity or hazard (such as vehicle borne IEDs and sophisticated command devices) which exceed the scope of normal HIEDD operator capabilities. These will require detailed planning and/or referral to another agency.

Team Structure

This SOP is written assuming that the HIEDD team is separate from the clearance team. In a standard configuration the team will consist of:

- **EOD Operator.** Team Leader course, IMAS EOD level 3, specific-to-country HIEDD certification
- **EOD Assistant.** IMAS EOD level 1, HIEDD Clearance training, HALO paramedic course
- **Team Medic.** HALO paramedic course
- **Driver.** Driving assessment and IED awareness training

Render Safe Procedure Process

Following identification of a potential device the HIEDD operator will split the RSP into 4 phases:

- Arrival and preparation phase
- Planning phase
- Diagnosis & disposal phase
- Final clearance and completion phase

¹ As a humanitarian organisation HALO will not conduct HIEDD when there is the possibility that they can or will be deliberately targeted by a belligerent. This is separate from by a belligerent intentionally hindering clearance through the inclusion of features such as anti-lift, anti-handling and combination switches prior to the cessation of conflict in that area or region. The critical factor is whether belligerents emplace new devices to target HALO post start-up of clearance activities.

² The key considerations being related to the safety of the EOD team particularly the safety of any approach routes. It may be that a spot task is not appropriate and that NTS followed by a full clearance task should be conducted.

SECTION ONE – Arrival and Preparation Phase

1.1 Confirming the location of the hazard

The EOD operator should be clearly briefed on the general background of the task, the location/nature of the device and how it was found. They should also confirm that they are in a safe area and that the control point (CP) is at a suitable distance from the device. The location and marking of the safe approach route from the CP to the device should also be confirmed. If the HIEDD operator is not satisfied, they should reposition the CP accordingly.

1.2 Cordon and Evacuation

Before approaching the device, the operator should confirm communication and medical point/CASEVAC procedures, and establish a cordon. When establishing a cordon, the exact explosive hazard presented by an IED is unlikely to be known. As a minimum a 200m cordon should be in place prior to any manual approach to a suspected IED. If a more detailed assessment can be made, the CP provides defined direction or if additional information become available during the conduct of the RSP then the following should be applied.

- HME blast-cased up-to 20kg 200m
- HME blast-cased over 20kg 300m
- Metal-cased charge under 20kg 400m
- Metal-cased charge over 20kg 600m
- If a large HME or conventional ordnance main charge is confirmed during a task, the HIEDD operator is to reassess the appropriate cordon and safety distance. This may require referral to HALO's Global EOD SOP and/or the Operations Manager. Any intended change in minimum distances due to threat assessment, partial evacuation or location of the task, etc., will require the approval of the Operations Manager.

The HIEDD operator should ensure they can communicate with all members of the cordon, that they are located at suitable positions and that the danger area is fully evacuated before they proceed to the diagnosis and disposal phase. Achieving these cordon distances and ensuring that they are enforced in urban and congested areas may require assistance from local police or security forces.

1.3 Control Point set up

Once the EOD operator has established that they have a CP that is in safe area and located at a suitable distance from the suspected IED, they should direct their team to start preparing and testing equipment. If necessary this should include set up of a stretcher and MTK; 'Exploders' should be tested, firing cable continuity and radios checked. The clearance Team Leader and team member who found the device should remain in the CP as long as the HIEDD requires them.

SECTION TWO – Planning Phase

2.1 Assessment

The EOD operator should conduct an assessment before approaching the device. This should involve them speaking to the clearance Team Leader and the team member who found the device to gain a detailed description of what was found, how it was found, how it was marked and any other relevant factors that may help them plan their RSP (e.g. suspicious ground sign nearby). The HIEDD operator should try to evaluate what sort of device it is likely to be prior to making their first approach. The list of considerations is lengthy and will depend on the circumstances, but key considerations that may help could include:

- Previous devices found in the area (by clearance team, local people or other agencies)
- General tactics and techniques used by those who placed the IED
- What sort of effect is the IED trying to achieve (e.g. block a route, target an individual etc.)?
- What have previous clearance agencies done (e.g. did anyone pick up items by hand)?
- The type of accidents in the area; what sort of injuries were there, how did they happen?
- What does the item that was found suggest (e.g. might it be a pressure plate, RC pack etc.)?

2.2 Planning

The EOD operator should plan as much of the RSP as possible while in the CP. This should minimise time spent inside the explosive danger area while the threat of a viable device still exists. During this planning time any equipment can be prepared (e.g. hook and line stakes fitted with pulleys, shaped charges filled, disruptors charged etc.). The HIEDD operator should then brief their team, the clearance Team Leader, sentries and any supporting agencies on the plan. As a minimum this brief should include:

- The locations of the device, CP, medical point and sentries/cordon
- The approach route the EOD operator will take to the device
- 'Actions on' in the event of an unexpected explosion or accident
- Casualty evacuation procedures from the device to CP, CP to hospital etc.
- Outline of the planned technical RSP and approximate time required
- Communications methods between the EOD operator, the cordon and team members
- Details of any secondary hazards in the area (e.g. petrol stations, power lines etc.)

SECTION THREE – Diagnosis and Disposal Phase

3.1 Disposal

As each scenario will be different, it is impossible to give specific RSPs in this HALO Global IED SOP. The HIEDD operator is to use their training and knowledge to formulate and execute an RSP that complies with HALO's guiding HIEDD aim, philosophies, principles³, mandatory actions, conventions and referrals.

Mandatory Actions

The following mandatory actions must be adhered to throughout the conduct of a HIEDD RSP. They support to philosophies and principles that are laid down in Section 1. These mandatory actions can be amended by the Programme Manager in consultation with HALO Global Technical Management.

- If at any stage HALO HIEDD teams encounter an IED they believe has been emplaced after the commencement of HALO clearance operations, then they are to cease operations immediately.
- VBIEDs, Passive Infra-Red (PIR) IED, and RCIEDs fall outside the scope of standard HIEDD clearance plans. Prior to any clearance and disposal activities involving these devices a written pre-plan is to be produced incorporating an activity hazard assessment and approved by the Operations Manager.
- Water based energetic disruption of an IED's power source(s) is the preferred means of neutralization. If this is not feasible remote and semi-remote component separation should be conducted. Details on disruptor use at Annex E.
- All positive action must be conducted remotely or semi-remotely. No manual actions are to be conducted, including manually cutting detonating cord.
- All IED components must be remotely or semi-remotely moved prior to manual handling.
- PPE must be worn on all manual approaches. As a minimum this includes a de-mining apron, visor, boots, gloves and cotton trousers and long-sleeved top⁴.
- All manual approaches after a de-miner has confirmed a suspect IED must be conducted as a one-person risk.
- No positive action shall be conducted until effective cordon and evacuation is in place.

Conventions

Conventions are a series of best practice measures that have been developed to be specific to the operational HIEDD task. They have been developed by HALO based on recent and current MA IED threat environments, often where there is a degree of uniformity in the construction of IEDs. Conventions can be applied by HIEDD operators to good effect and their use increases assurance in how HALO staff conduct HIEDD RSPs. They can be adapted by the programme but conventions that should be commonly applied to HALO HIEDD Operations are:

³ HIEDD aim, philosophies and principles are laid out in Section 1 – Task Management.

⁴ Ballistic helmets and plates are to be considered as part of programme activity hazard assessments.

- **A visual and detector search.** Should be conducted prior to walking any surface if the presence of a victim operated IED cannot be discounted. If the surface is not appropriate for detector search, such as a hard-topped floor, a systematic visual search including the use of optical aids and trip wire feeler, should be adopted.
- **Firing switches should be avoided.** Both when planning an approach and during the conduct of an RSP one of the first actions should be to assess and identify the functioning method of the IED⁵. Once the HIEDD operator has identified the switch(es) they should avoid conducting any action in their vicinity as it is likely to be the most sensitive part of the device and present the greatest hazard to the operator.
- **Consider multiple power sources/main charges.** The RSP should take into account the possibility of additional concealed power sources/main charges. If the full device make up cannot be ascertained the HIEDD operator should assume worst case and consider using disruptive or explosive means on all components to eliminate this threat.
- **Cutting a single wire.** When dealing with a buried victim operated device the HIEDD operator should consider inducing an element of safety if a single electrical wire is identified during fingertip search procedures. This should be achieved through the application of a semi-remote technique. Extreme care should be taken at this stage to avoid “cutting across the switch” (see Annex D).
- **Detonator safety.** This should be conducted as early as possible during the RSP commensurate with safety. The detonator should be placed in a safe location⁶ in accordance with the procedures at Annex B
- **Destruction in place.** The in-situ destruction of an IED using a suitable explosive donor charge should always be considered as an option when planning an RSP.
- **Lack of energetics/explosives.** If energetics for disruption are not available, then semi-remote component separation techniques should be used, with the electrical lead from the power source(s) and/or detonator(s) the preferred components to attack.
- **Grouped switch / power sources.** When the power source is internally located with the firing switch (common Da’esh tactic for pressure plates and anti-lift switches) and no energetics are available the HIEDD operator should assess, locate and identify the detonator(s) and conduct semi-remote actions on appropriate electrical leads.
- **Buildings access.** When operating in buildings the HIEDD operator should consider alternative approaches to avoid obvious vulnerable points such as doorways.
- **Safe working area.** The HIEDD operator should ensure that the area in which they are working is safe and large to lie down/work in and that it is clearly marked. This may necessitate conducting further clearance if required (in accordance with part 3 of these HALO Global IED SOPs)
- **Carry an EOD tool.** The HIEDD operator should always carry a suitable EOD tools on every manual approach. This will allow them to respond to un-expected situations with an appropriate EOD

⁵ Much of this can be done in the planning phase where in-depth analysis of the area’s history and perpetrator’s intentions can be used to draw conclusions about the likely nature of the IED

⁶ Note if it is assessed that any part of the device may contain a concealed hazard then the component should be destroyed in place rather than recovered.

action (e.g. discovery that the power source has not fully separated from the circuit following a semi-remote separation attempt). A disruptor is often the most suitable piece of equipment; but a donor charge, shaped charge, J-knife, or other tool may also be carried.

- **Device make-up.** Consider establishing/confirming complete device make up before completing EOD action. It may be appropriate to expose more of the device (if buried, for example) before attempting or continuing with the final stages of an RSP. This should avoid physical interaction with the device and may require the use of semi-remote techniques or fingertip searching.
- **360° search.** While conducting a 360° search around the device to ensure there are no electrical or detonating cord links to other devices, the HIEDD operator should always consider the degree to which it is appropriate, as the more extensive the searching the greater the risk to the operator (i.e. they are more likely to accidentally disturb the device)
- While humanitarian operators should never be at risk of being deliberately targeted by physically linked command devices during clearance operations, the HIEDD operator should always clear these types of devices with the assumption that the device may have been laid to target security forces who may have previously been active in the area. Detailed at Annex C.
- Once the device has been neutralised all components should be removed from their emplaced locations using semi-remote means if this has not already occurred. This should be conducted in accordance with the H&L procedures at Annex A.

As detailed in HALO Global IED SOP Part 1 and in the mandatory actions of Part 5, none of these conventions involve manual action. All RSPs must be conducted semi-remotely, including cutting detonating cord.

Referrals⁷

Referrals are occasions when an HIEDD operator must contact the Operation Manager. Further communication is encouraged but is not considered mandatory. Referrals will be made when:

- An un-planned explosion occurs during the conduct of positive HIEDD action.
- A device incorporating multiple firing switches is positively identified.
- Prior to positive HIEDD action on a suicide device⁸.
- Identification of a new or novel device, whether for technical guidance or to ensure immediate passage of critical information to other HIEDD operators and clearance teams.
- Prior to conducting operations outside an approved HALO task site. Including IED spot tasks.
- If the HIEDD operator believes that deviation from any Principle or Mandatory action is required to complete a task safely.
- If the HIEDD operator requires additional resources, including time, to complete the task safely.
- If the HIEDD operator believes they lack the training, equipment or capabilities to successfully complete the task.
- Prior to conducting the following EOD actions: semi-remote cutting of a command wire, semi-remote removal of an internal detonator, the EOD actions specified in Annex G (mechanical).

⁷ These referrals can be adapted in due course to make them specific to the programme. In general the referral authority should be the country operations manager, however if a more senior/qualified HIEDD operator is in country then the PM may delegate them to take on this role

⁸ This is in relation to person borne suicide devices that are not attached to a live or dead suicide bomber. HALO will not conduct disposal of attached suicide devices; these will be diverted to other agencies.

SECTION FOUR – Final Clearance and Completion Phase

4.1 Final Clearance

Once the HIEDD operator is satisfied that all the components are removed/destroyed (or in a safe state for handover) they should conduct a thorough search of the area from which the device was removed using a hand-held metal detector and deminer's tools as necessary. They should replace any marking they removed, as it is best practice for the clearance team to resume clearance from where they stopped and fully clear through the area where the device was found.

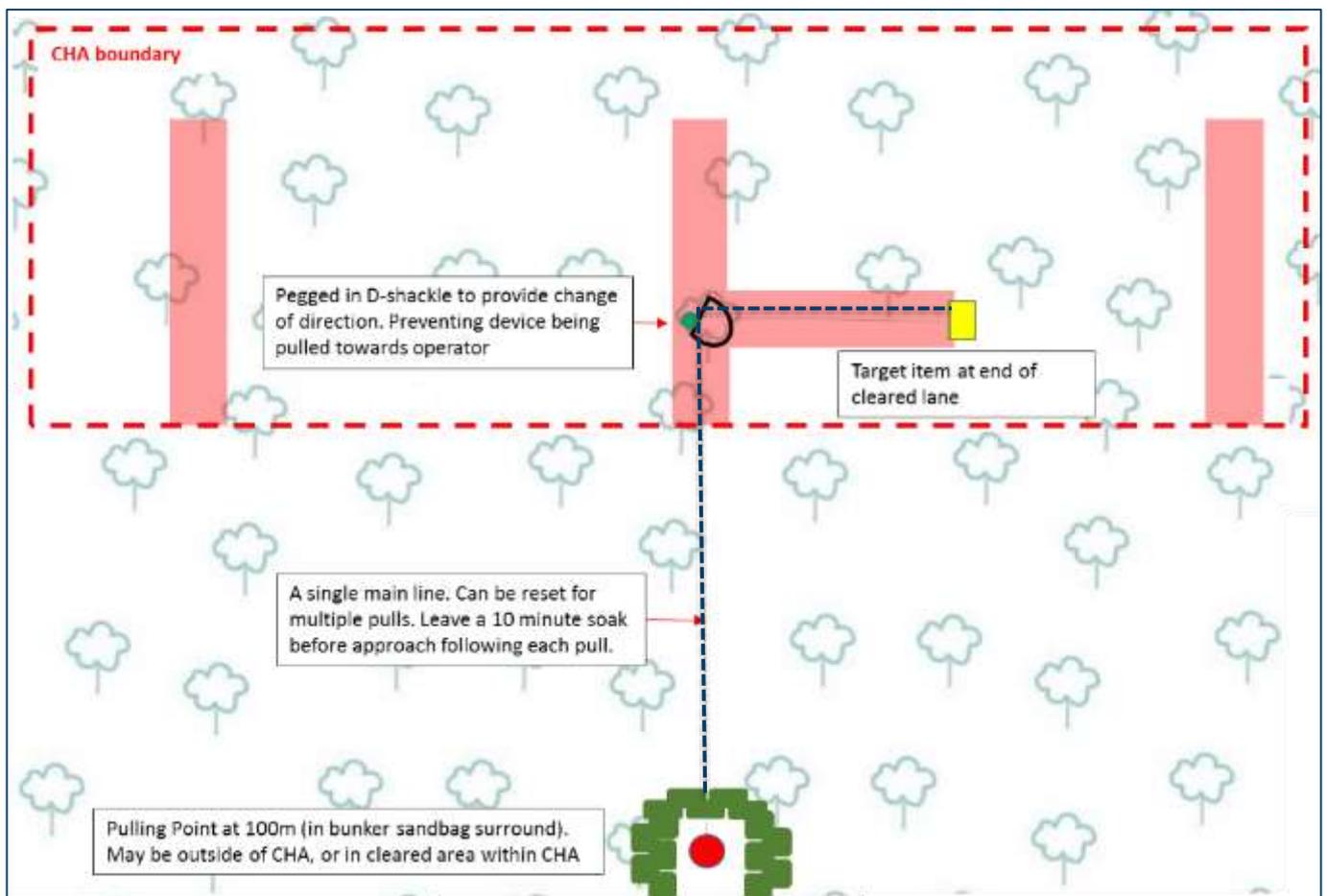
4.2 Final Actions

The HIEDD operator is to ensure that the clearance Team Leader is fully briefed on areas that were cleared during the conduct of the RSP, the state of any marking, and what was found/disposed of. Once this is done, the HIEDD team should then check all their equipment and ensure they have collected all information for any reports required. The HIEDD operator is then to report the completion of the task to operations management staff.

Annex A - Hook and Line

1. **Introduction.** While technical equipment supporting HIEDD operations is likely to vary significantly between tasks, it is almost certain that hook and line techniques will be required to some degree. Hook and line can be used for a variety of EOD action, in HIEDD it will principally be used to move objects to mitigate secondary hazards (e.g. anti-lift devices), to move components away from property prior to destruction, or as a supporting component of another technique (e.g. non-explosive wire cutting using a J-knife). The exact method of employment will vary from task to task, but in all cases the HIEDD operator should follow the following procedures:

The HIEDD operator must assume that the device could function at any time during movement by Hook and Line. As such sufficient mitigation (cordons, protective works, tamping etc) must be in place throughout the “pull” to remove risk to life and property.



- Ensure the cordon and evacuation plan is in place as per a controlled demolition. i.e. cordon size appropriate to item being pulled.
- Ensure that sentries are deployed and confirm the cordon is in place (as for a controlled demolitions)
- Establish a safe pulling point; a blast and frag shielded location at a minimum of 100m from the target. For large objects that pose a significant blast/frag hazard such as a metal cased main charge

this may need to be increased. If necessary, a sand bag wall/bunker should be constructed. This should be at least two 40kg sand bags thick and 1.5m in height.

- The HIEDD operator will put on PPE prior to leaving the CP.
- The reel should remain at the pulling point and the rope pulled out down the cleared lane to the object. Care should be taken to ensure that rope does not snagged or move into an un-cleared area. Pulleys and stakes should be used where needed.
- Connect the pulling rope to item using an appropriate method such as hooks, prusik loops etc.) and return to the pulling point.
- Final check with sentries and carry out the pull. The rope should be pulled slowly, taking up the slack, continuing until the desired effect has been achieved.
- Following the pull, a 10 minute secondary soak period shall be observed. If there is a risk of time delay booby traps, then an extended soak is to be set by the Operations Manager.
- During HIEDD operations it is essentially that the pull tumbles the object through all its planes. An object which has only been moved sideways cannot be considered to be free of anti-lift components and will require a second pull before manual handling.
- The HIEDD operator will then approach the target and confirm that the pull has been successful. This will involve checking the pulled component and searching of the area where it was pulled from with a metal detector and by hand.
- The hook and line drill should now be considered complete and the HIEDD operator can proceed with further EOD action as required.

Annex B – Detonator Safety Drills

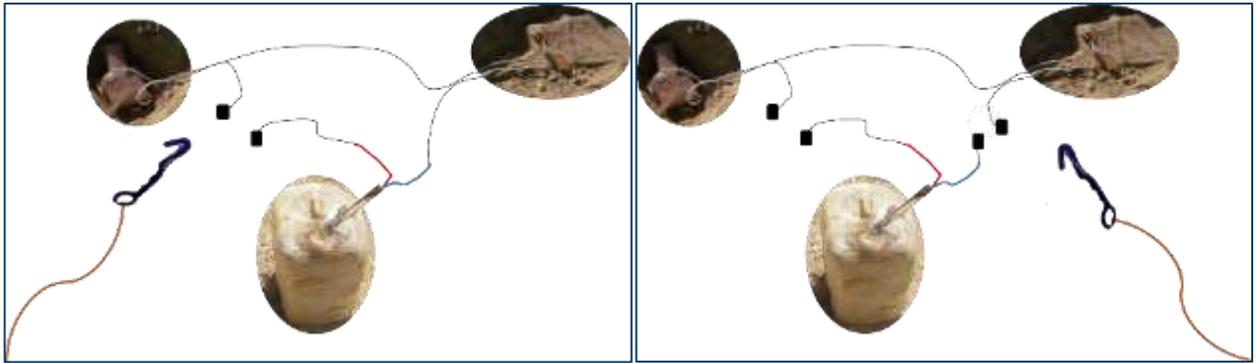
Unlike conventional landmines which normally use striker/percussion-cap based detonators, the majority of victim operated IEDs are likely to be based on an electronic circuit and as such incorporate an electrical detonator. All detonators have inherent hazards (static, RF, crush sensitive etc.) and in the case of IEDs the detonator itself may be homemade and therefore be more sensitive than a military or commercial version.

Even once the power source, switch and main charge have been separated, a detonator attached to a main charge will still pose a hazard. While planning an RSP the EOD operator should consider the following:

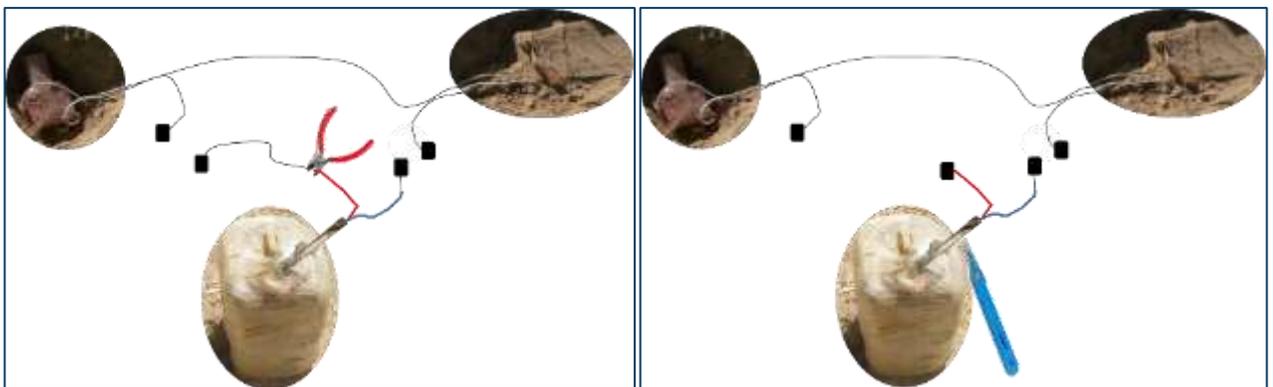
Once a detonator has been semi-remotely separated from the firing circuit it will present an exposed electronic device hazard. i.e. there is a risk of radios initiating the detonator. Exposed/separated detonator leads also present a static hazard. i.e. a static discharge could initiate the detonator

As such the EOD operator is to apply the following detonator removal drill. This drill should only be applied once complete separation of the detonator from the firing circuit has been conducted. If there is any doubt further semi-remote action must be taken to ensure this is the case.

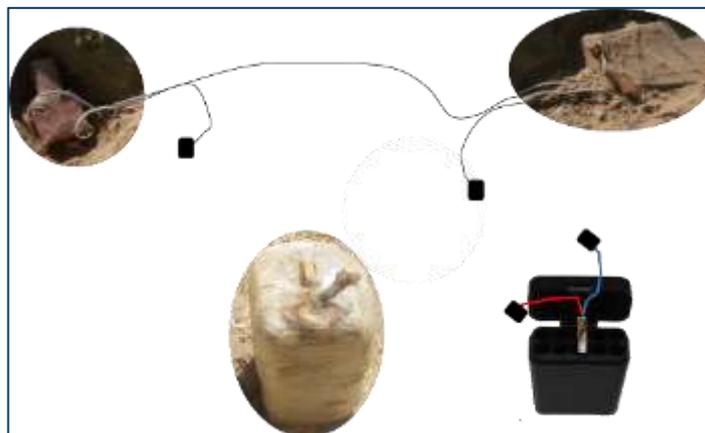
- **Approach preparation.** The HIEDD operator should assess the likely condition of the device from the CP (this may include attempting to get eyes on the device remotely using binoculars, drones or other remote cameras), then plan their actions and equipment accordingly. As a minimum they should be wearing PPE and carrying:
 1. Hand held detector
 2. Hand tools/signal investigation equipment
 3. Sharp wire snips
 4. Electrical tape
 5. Scalpel
 6. Improvised detonator storage tin
 7. A suitable item of EOD equipment (disruptor, donor charge, J-knife and line etc.)
- **RF hazard mitigation.** The operator should leave any radios, mobile phones or other RF emitter at a drop point 25m from the expected location of the detonator. Alternatively turn off all devices and carry them forward.
- **Confirmation of separation.** Once at the device's location the operator should visually confirm that EOD action has resulted in the detonator becoming completely separated from the electrical circuit, i.e. there is no continuous connection between either of the detonator leads and the remainder of the device.



- Static precautions, inspection and insulation.** The operator should then take static precautions, (*ground himself for a minimum of 5 seconds*), inspect the detonator/leads for signs of damage or tampering, then cut off any excess wires (i.e. any connecting leads fitted to the detonator leads), and then insulate the exposed detonator leads with tape. They may also insulate any exposed wires from the remainder of the device at this stage if appropriate.



- Removal of detonator from explosive train.** At this stage the detonator should be removed from the main charge. This will normally be achieved by slicing any tape holding the detonator onto the main charge with a scalpel (note due to the sensitive nature of detonators this should always be sliced, never pulled etc.). The detonator should then be placed in an empty detonator tin for subsequent destruction.



At this stage the operator should resume their RSP as planned. This may require further EOD action to mitigate the risk of additional devices. In cases where multiple detonators are present the HIEDD operator

should take positive action to on each firing circuit prior to the removal of any detonator; this reduces the possibility of interaction with the device whilst it remains in a viable state. Exposed / barred wires should always be insulated as the RSP on a multi switch / multi detonator device progresses.

In some cases it may not be possible to safely separate the detonator from the main charge. E.g. where the detonator is embedded inside the main charge container. In these cases the detonator's leads should still be insulated, RF hazard precautions taken, and the main charge destroyed as soon as possible. Devices should only be transported over short distances carefully by hand, as there is still a risk of initiation.

If there is an absolute requirement to remove the detonators a disruptor, or other semi-remote means, should be used to remove the detonator form the container accordingly. HIEDD operators refer to and seek guidance from the Operations Manager prior to undertaking this procedure.



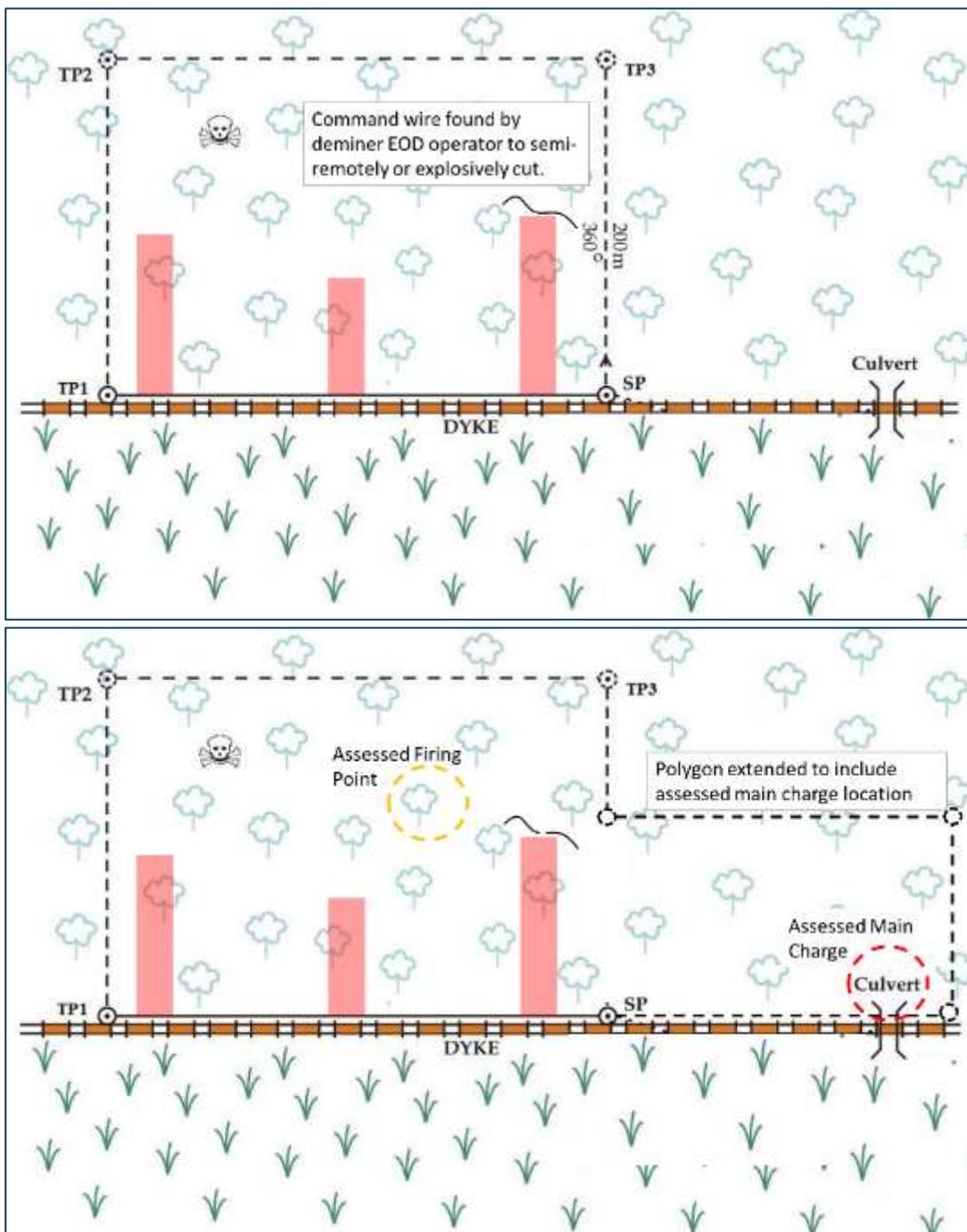
Example of container-embedded detonators positioned for final demolition. Note the insulation of exposed wires.

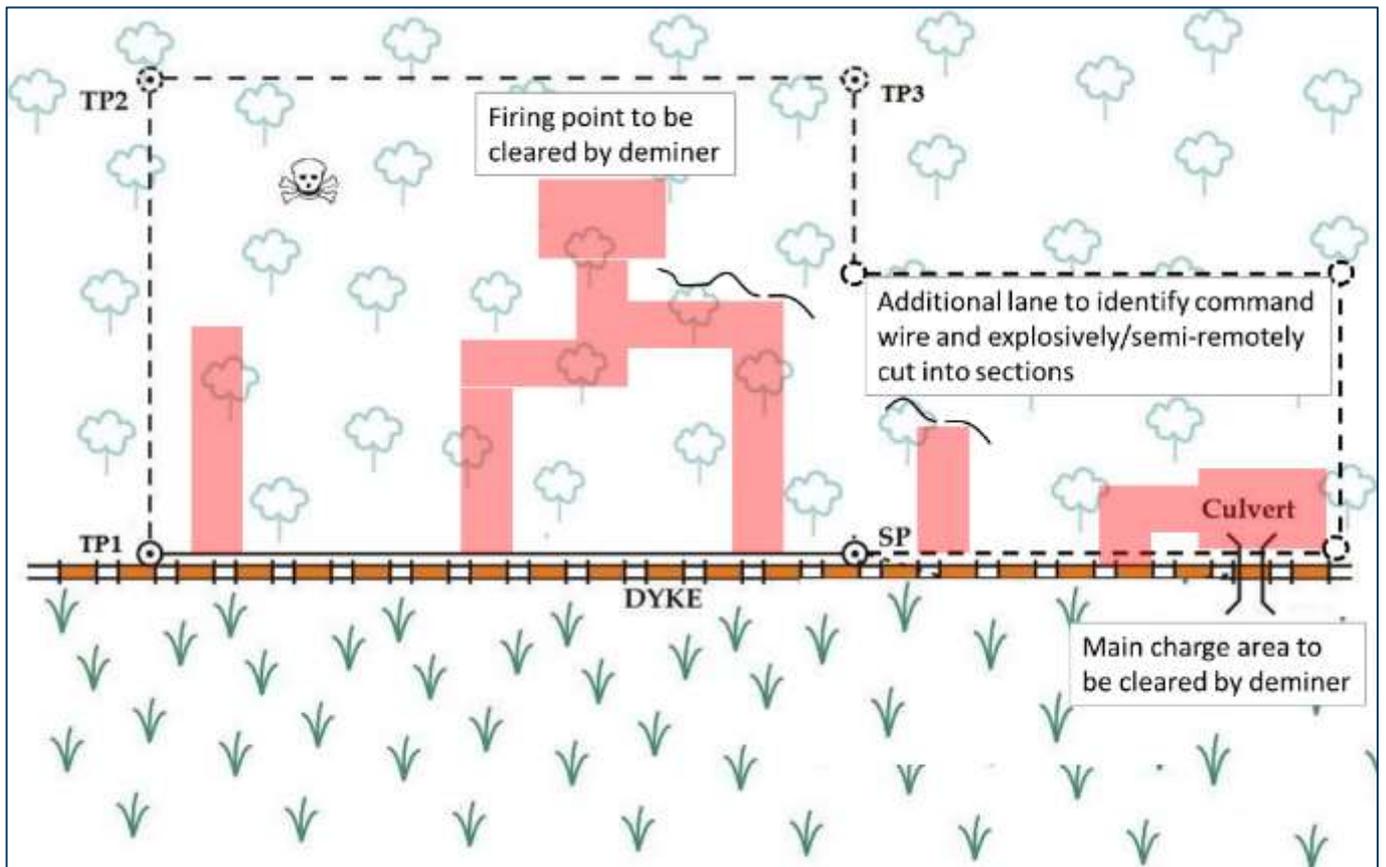
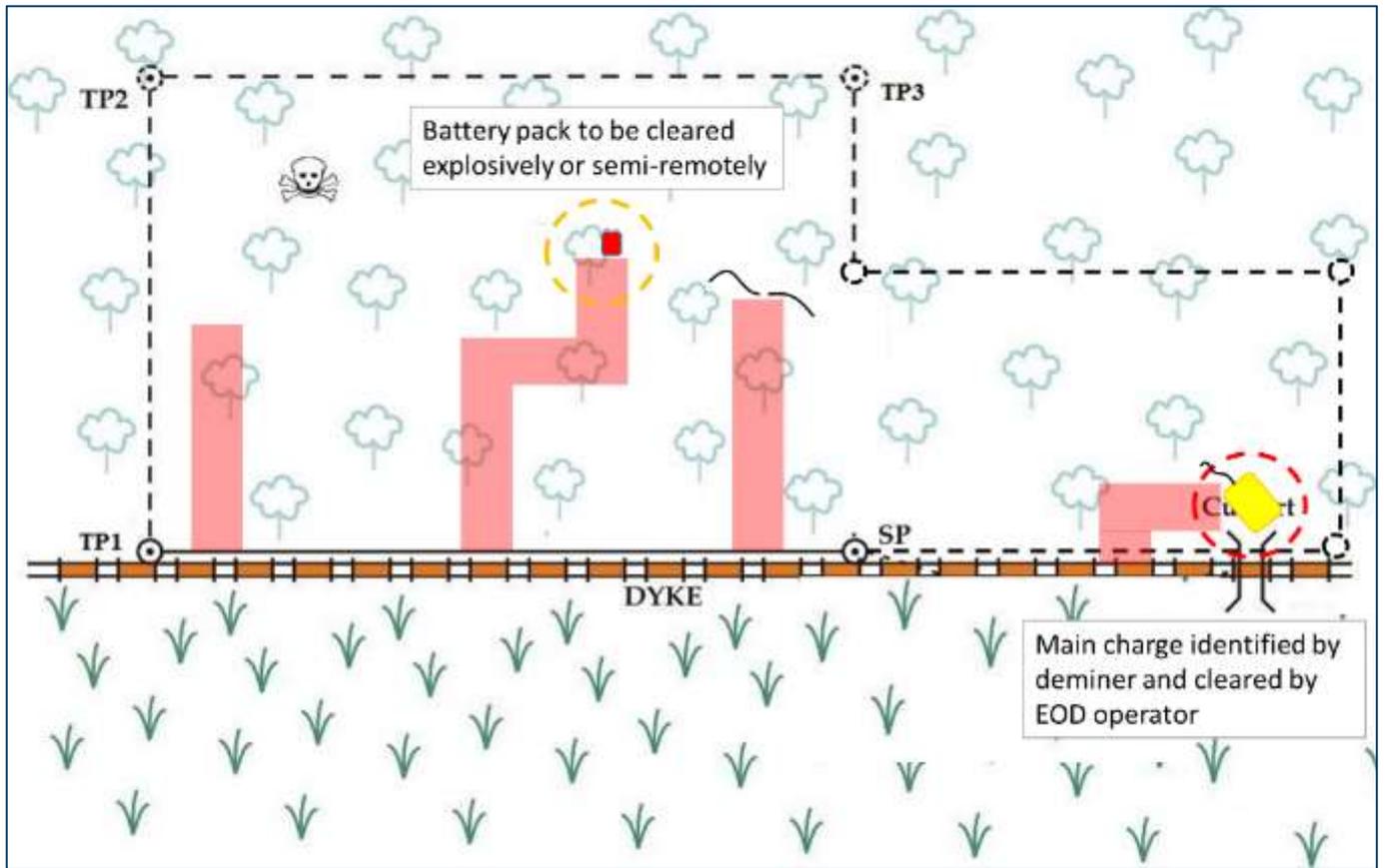
Annex C – Physical Link Command Device Drills

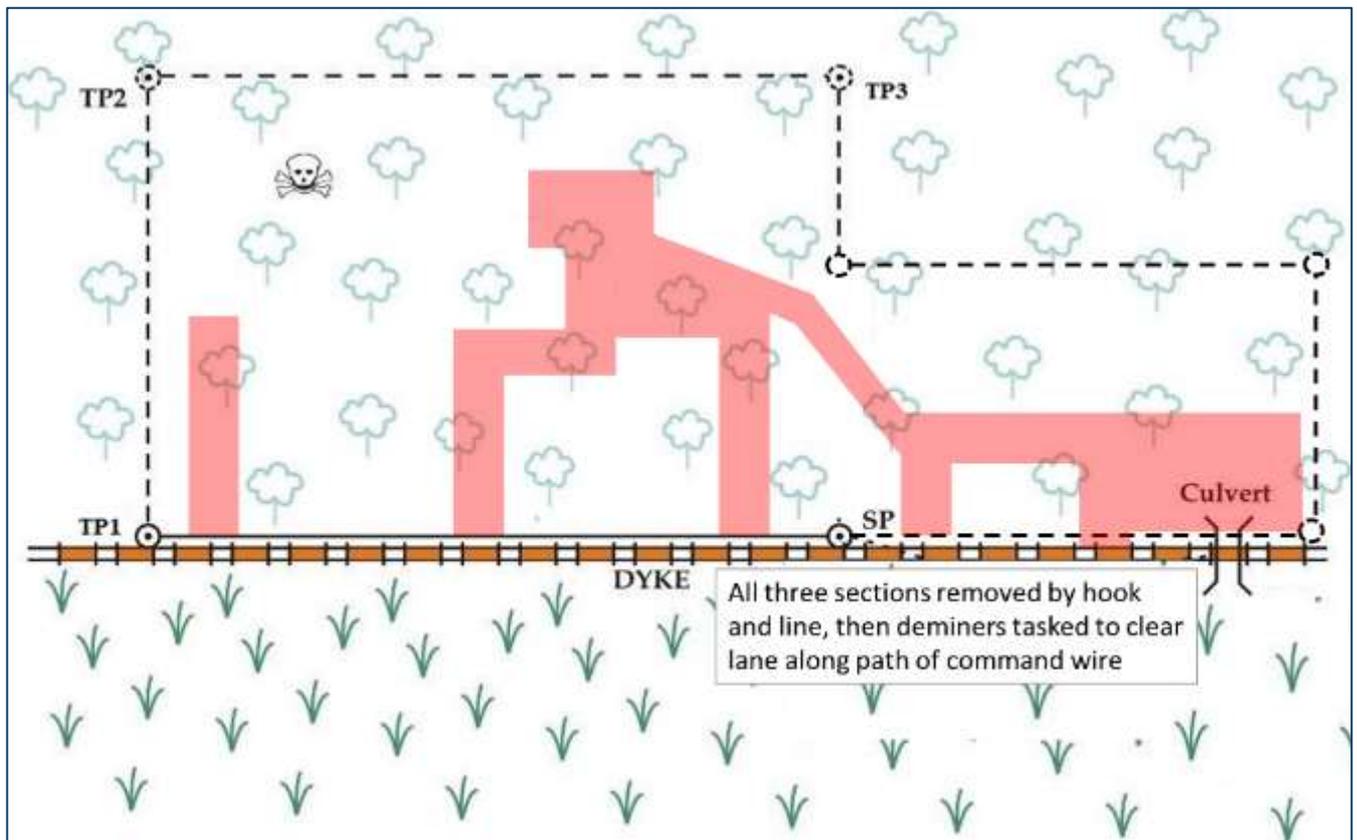
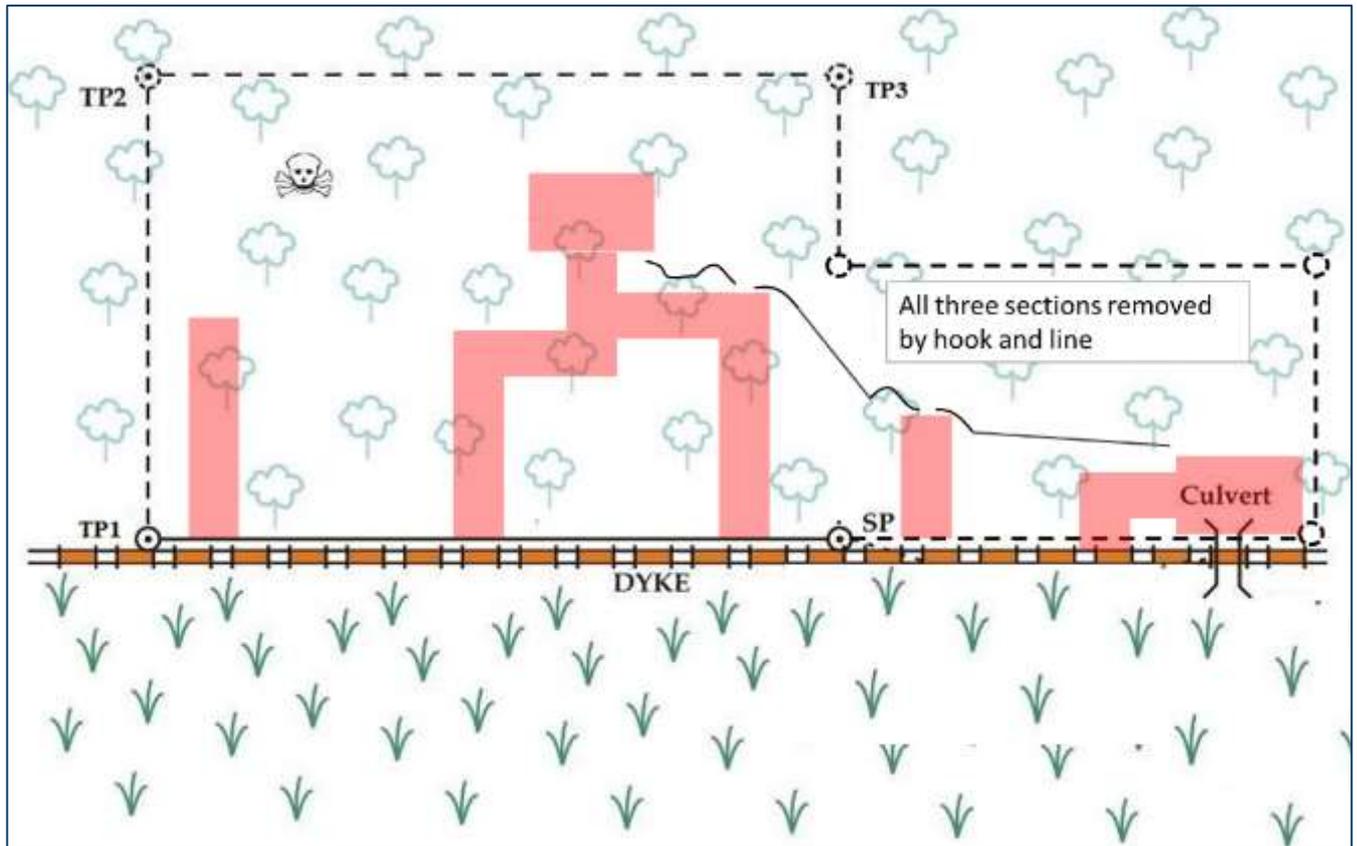
While humanitarian operators should not be concerned with belligerents targeting teams with command devices an HIEDD operator should always consider that devices may have been set up to target patterns set by security forces that previously operated in the area. When dealing with physical link command devices (usually command wires, but possibly command pull or similar) the operator will also be required to assess a device over a large area and make judgments about where the greatest hazard is present and how best to mitigate it. If a command wire is encountered during clearance operations the following drills and considerations should be adhered to:

- **Identification and confirmation of command link.** When a deminer identifies a wire it may not be immediately clear whether it is part of a smaller victim operated device or a larger command device. Regardless the item should be marked and an HIEDD operator tasked accordingly. The operator must then make an assessment as to whether the device is likely to be a command device and if so where the likely firing point and main charge(s) are.
- **Task Assessment.** The operator should consider the implications on the wider task, and whether or not the polygon will need to be extended to cover the anticipated full length of the command link, the main charge and firing point. If the EOD team is separate from the clearance team this will require close coordination between the Team Leader and EOD operator.
- **Cutting of the physical command link.** The operators may consider the semi-remote cutting of the link. In the case of a command pull device this should be done explosively using a detonator/detcord placed close to, but not touching, the link. In the case of a command wire this may be done explosively or using a J-knife, flying scalpel etc. (in this case care should be taken to mitigate the risk of “cutting across the switch”). The HIEDD operator should then conduct an approach to confirm their actions and insulate any exposed wires. This action may not be required in all circumstances and the operator should refer to the Operations Manager before conducting this procedure.
- **Clearance of the penalty device.** The main charge is likely to present the greatest hazard at this stage and a deminer should be tasked to clear a lane towards its assessed location. Consideration should be given to the fact that there may be more than one main charge, linked either electrically or by detcord. Once the main charge has been identified the HIEDD operator is to continue their RSP in accordance with the principles described in this HALO Global IED SOP, this is likely to include further semi remote cutting of linking wires, removal of the main charge(s) and detonator safety.
- **Clearance of the firing point.** A deminer should be tasked to clear a lane towards the assessed location of the firing point, due to the distances and time involved it may be possible to do this concurrently. Any items at the firing point (batteries, switch packs etc.) must be destroyed in place or cleared semi-remotely by the HIEDD operator. Due to the risk of protective victim operated devices the firing point, consideration should be giving to extending the clearance polygon if it falls outside the current boundary.

- Clearance of the physical link.** Once the main charge and firing point have been cleared the EOD operator should then supervise the clearance of the physical link itself. Due to the risk of anti-lift devices being attached to the link, it should never be lifted by hand. Generally, this is best achieved by the removal of the physical link by hook and line, although the safety distances must assume that an anti-lift device could function anywhere along the length of the wire. If this is thought to be impractical a deminer may be tasked to clear a lane parallel to the wire. This can then be cut into smaller sections semi-remotely and each section removed by hook and line. Due to the risk of anti-lift or protective victim operated devices the entire length of the physical link should be considered to be within the polygon and fully searched by the manual clearance team before the task is handed over.





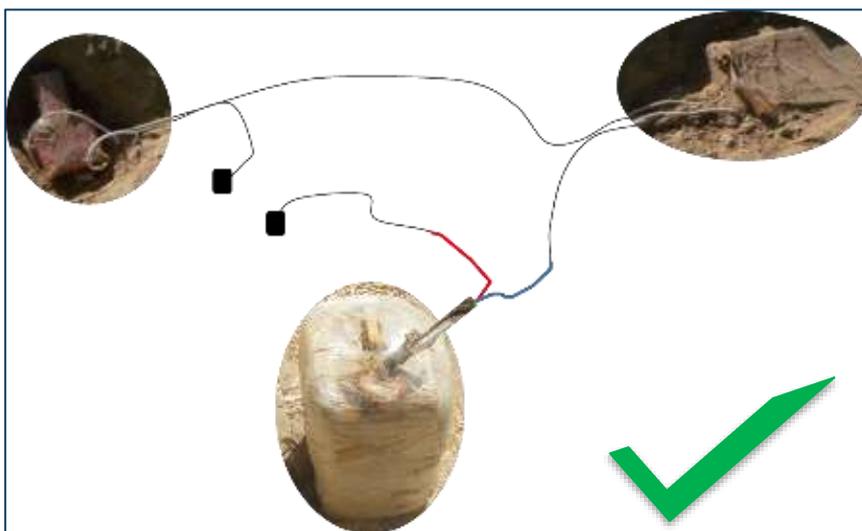


Annex D – Avoiding Cutting Across the Switch

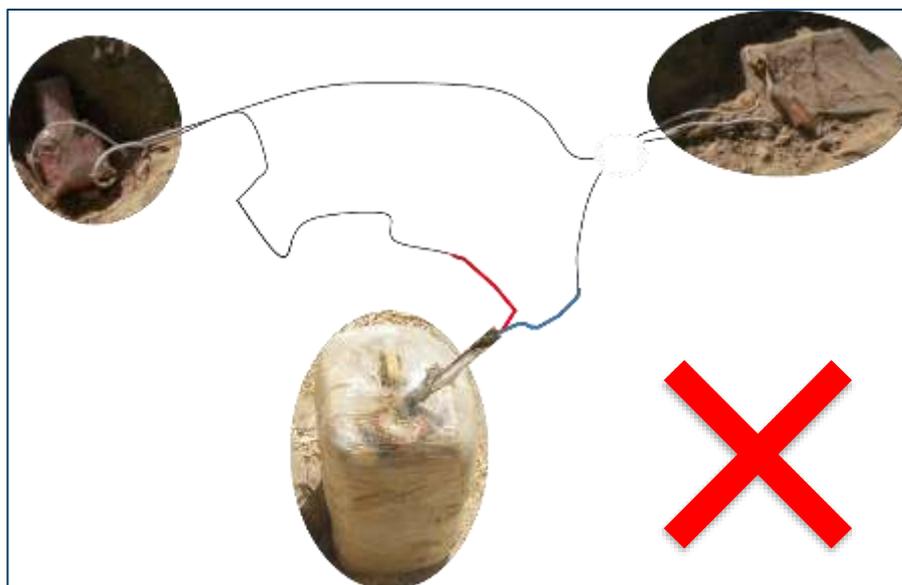
The majority of IEDs encountered are likely to be based on an electrical circuit, as such severing the links between the components is likely to prevent the device from functioning as intended. Although a single cut cannot guarantee this until the full makeup of the device is known, as there may be multiple power sources and initiators. Nevertheless, cutting a single wire as soon as practically possible is likely to significantly reduce the risk to the operator.

However, extreme care must be taken to avoid “cutting across the switch” as this is likely to make the device less stable. This annex will explain the concept and how/why it must be avoided.

1. In this example we can see the successful breaking of the circuit. In addition to the firing switch (in this case a pressure plate which is in a “normally open” position), there is now a second break in the circuit. This is subsequently insulated by the EOD operator on the next approach. Even if the pressure plate was depressed the circuit cannot be completed and the device will not be able to function as intended.

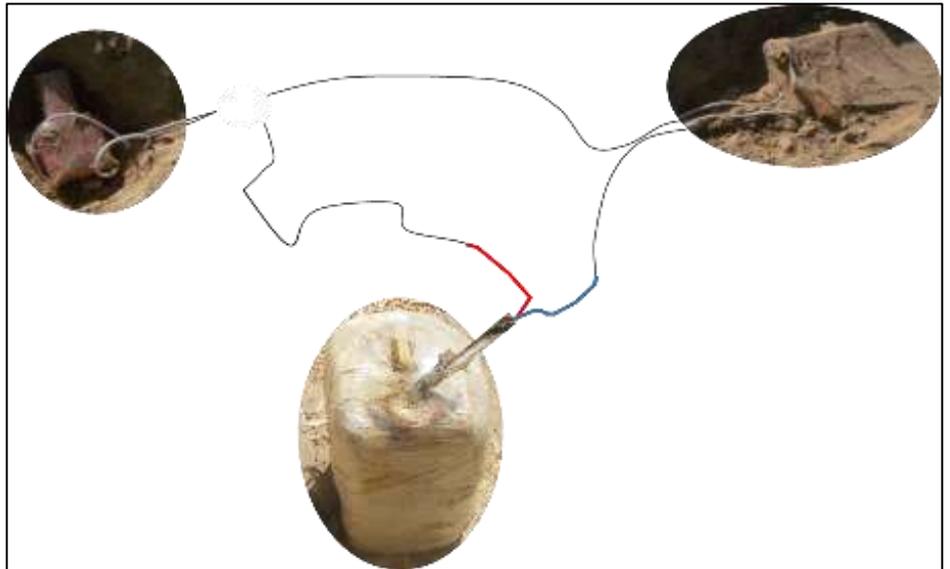


2. In this example although the circuit has been broken, because the two “switch wires” have been cut the HIEDD operator has created a micro-switch or short. If the two exposed wires were to touch, even for a second, the circuit would complete and the device would function. This is extremely dangerous as the next action for the operator would be to insulate the wires and/or hook

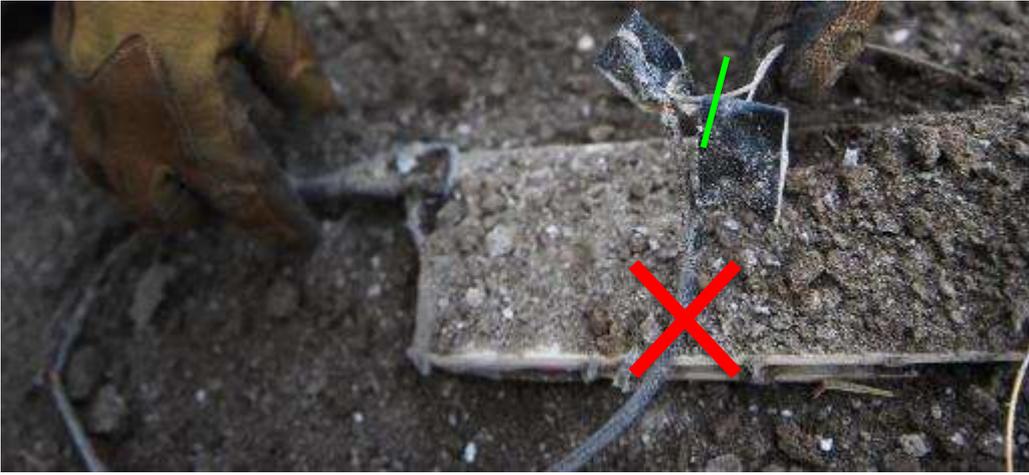


and line the components, this could move the wires and cause them to touch, which would have potentially fatal consequences. Particularly, as although easy to see in the diagram above, in reality it is likely that much of the device would be buried or tangled. Making it difficult to establish complete device layout.

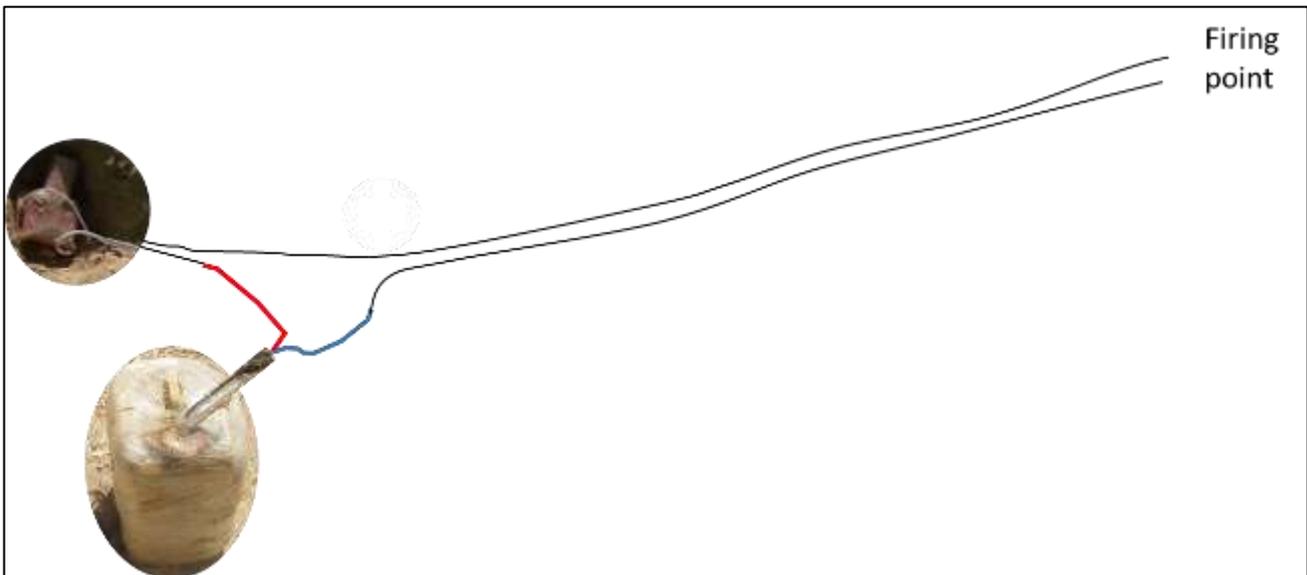
3. Here the HIEDD operator has successfully broken the circuit and although two wires have been severed, the cut is across the power source, not the switch. As such the device has been neutralized and is stable. However, in most cases the operator is unlikely to know if the device has multiple power sources, and/or distinguishing a power source from a switch can be difficult when components are buried and wrapped in tape/plastic.



4. In general a single cut, away from the switch is the most preferable option. It is unlikely that the device will be laid down in a clearly visible circular circuit, wires are likely to be linked together in places, entangled, partially buried etc. As such, the EOD operator will need to make careful assessments about where they position cuts a few cm's to the left or right can make the difference between situations 1 or 2 above if possibly fatal consequences. Examples below:



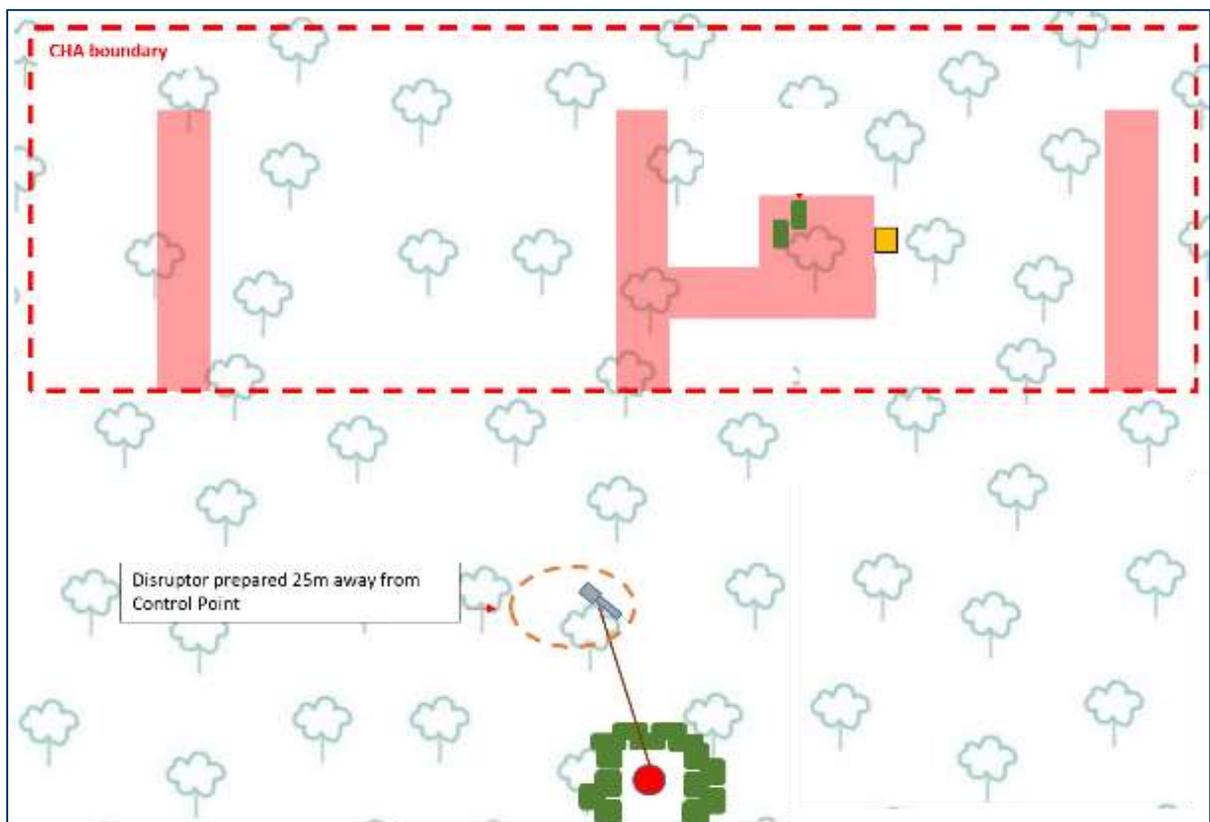
5. Although the risk will be most apparent in victim operated devices, the principle applies to all device types, regardless of the type of switch. For example, this can, in rare examples, apply to a command wire device. In the majority of command devices, the power source will be located at the firing point, but in rare occasions it may be co-located with the main charge. As such care must be taken when cutting command wires semi-remotely.



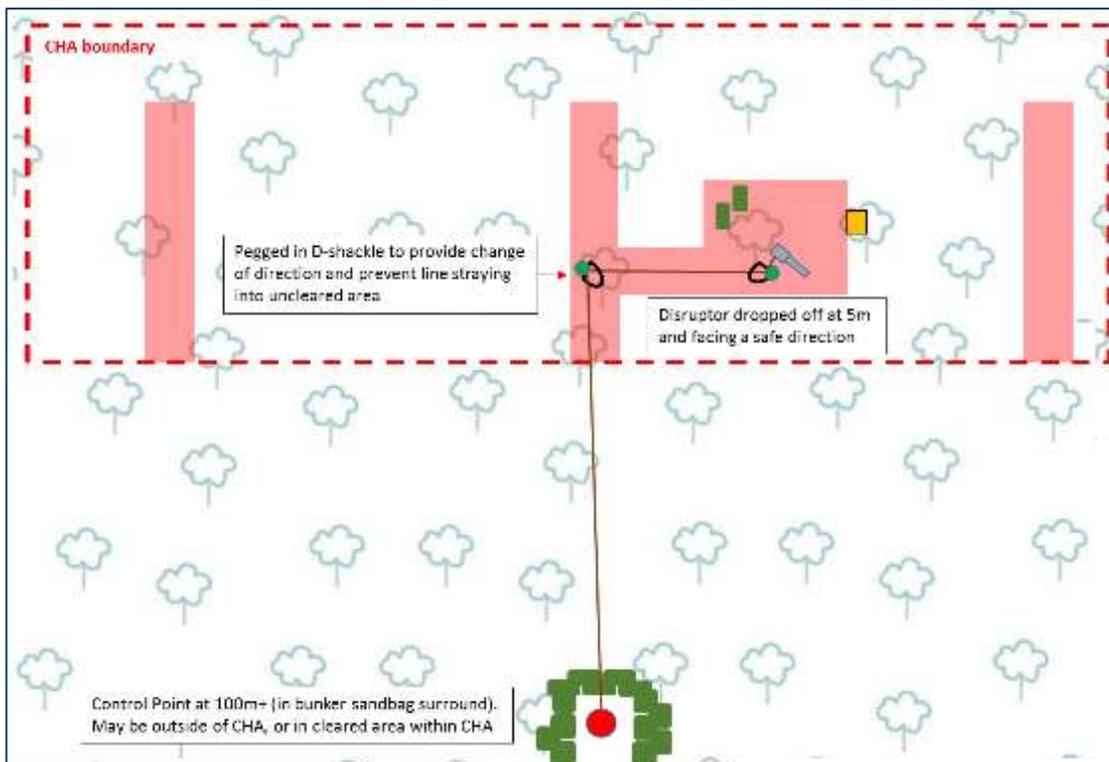
Annex E – Disruptor use for IEDD tasks

Disruptors are used by a number of HALO programmes for demining/EOD. While broad principles will remain the same there are some additional considerations that should be made when working in an IED environment. The aim of this annex is not to provide a user manual for individual items of equipment, but rather general procedures for use and placement.

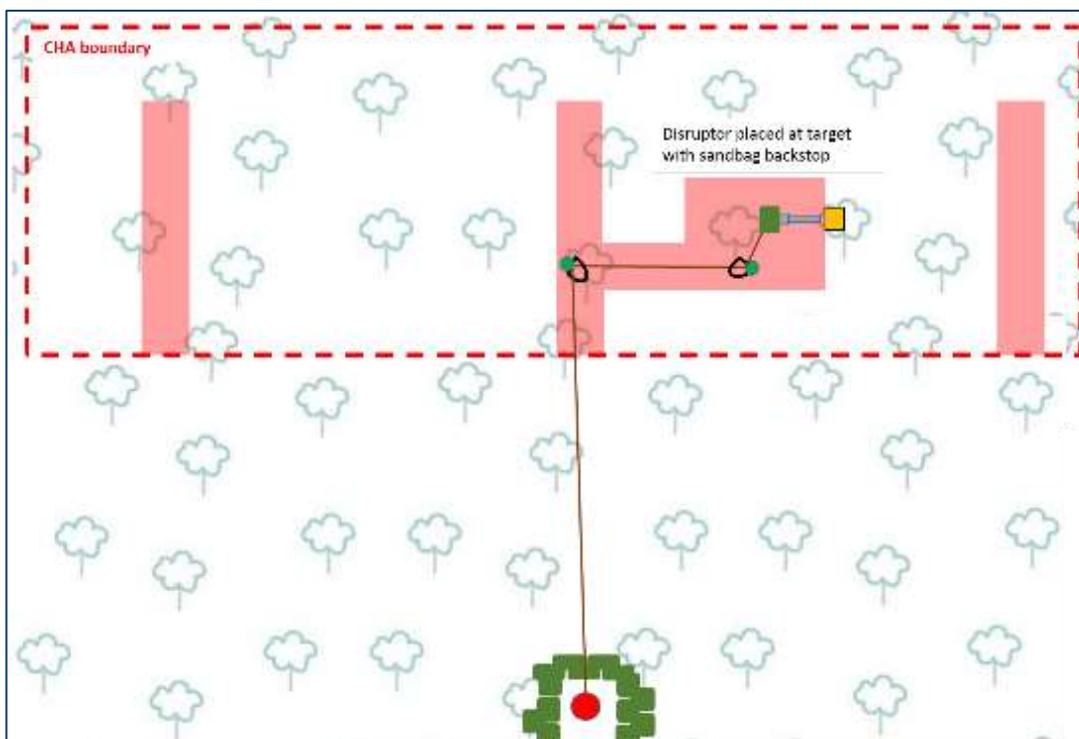
- EOD operators should aim to minimize the time that they are working in and around an IED. Preparing complex equipment in the vicinity of potentially sensitive switches generates unnecessary risk. As such the disruptor should be fully prepared from the safety of the control point. Note that electric matches function as exposed electronic devices and present an RF hazard. As such, all radios/mobiles phones should be turned off, or further than 25m away while the disruptor is being prepared.



- While approaching the device with the disruptor the HIEDD operator must ensure that the firing cable does not stray into uncleared areas. Use of stakes and carabineers/pulleys is likely to be the best way to achieve this.
- The HIEDD operator should place their equipment a short distance away from the IED with the disruptor pointing in a safe direction. The disruptor should be tied down/anchored to a ground stake in a cleared area, with consideration given to the likely direction of recoil/travel.



- When placing the disruptor, the operator should aim for be selective if possible and follow weapon placement principles as taught on the HALO Global IED course. Consideration should be given to the target and (regardless of the presence of a sandbag backstop) the recoil of the weapon. Although the disruptor should be placed as close to but not touching, it is preferable to have a slightly greater distance from the target than take additional time/risk in attempting to get the “perfect shot”.



- On returning to the control point the EOD operator shall again confirm the cordon is in place. The HIEDD operator should ensure that personal in the CP are behind hard cover and the HIEDD assistant operator should shout a warning prior to firing the disruptor.
- A 10-minute soak must be observed following firing of the disruptor before any manual approach is made. The first action of the approach will be to visually confirm the desired effected has been achieved and insulate any exposed wires.
- In the case of a misfire the operator shall apply a 10-minute soak before any manual approach and adhere to the misfire drills laid out in the Global EOD SOP. The first action of the approach will be to move the disruptor away from the device and point it in a safe direction, and then continue with fault finding as required.

Annex F – IED demolition *in-situ* considerations

Demolition *in-situ* (blown in place) using an explosive donor charge is a common way of disposing of conventional mines. There are also often circumstances where this is also appropriate for IEDs, however additional considerations are required due to the irregular nature of IED construction. HIEDD operators should consider the following when considering demolition *in-situ*:

- Handling, storage and transport of explosives is to be conducted in accordance with HALO Global EOD SOPs.
- Procedures for donor charge preparation, demolition procedures, misfire drills etc. are to be conducted in accordance with HALO Global EOD SOPs. If a programme believes there to be a requirement to vary these then they should seek guidance from the Global Chief Technical Advisor and document them in a separate SOP.
- While the charge placement principle of “as close as possible to the target without touching” remains best practice, HIEDD operators should consider their own safety to be paramount. IEDs are likely to be far more sensitive than conventional UXO/mines, as such it may be preferable to slightly increase the stand-off in order to ensure the device is not touched. Using large shaped-charges or larger donor charges may be of benefit as they reduce the requirement for the HIEDD operator to conduct fingertip search in the vicinity of the firing switch and the amount of time spent inside the explosive danger area.
- Following the demolition, the EOD operator should search the target area to ensure complete destruction of the device

Demolition *in-situ* can result in effectively “cutting across the switch” as outlined in Annex D; e.g. a switch is destroyed but a power source and main charge remain in place. This is particularly likely where device components are dispersed and/or there are multiple switches/power sources/main charges. In order to mitigate this the following should be observed:

- A switch or unidentified component should never be the target for demolition.
- Main charges are always the preferred component to target when conduct disposal in-situ. Consideration should be given to whether other components such as power sources and switches will remain post detonation of the main charge and what follow on actions such as hook and line will be required.
- If a suitable single wire is presented during a demolition in-situ RSP, then taking a single semi-remote cut should still be considered. Particularly if there is a requirement to conduct additional excavation to confirm device make up or locate the main charge.
- If during the post-demolition search the EOD operator identifies additional components that suggests that there is threat of exposed battery / electrical detonators leads exists and that further fingertip search could result in the unintentional completion of an IED circuit they are to cease operations immediately and refer to the operations manager.

Annex G –IEDD support to mechanical demining

Due to the processes involved mechanical demining will normally require a specific approach to IEDD. IEDs lifted during the mechanical process will normally be damaged, potentially putting them in an unsafe state. However, the presence of heavy plant will allow a greater range of RSP options; including mechanical lifting and disruption/break up of devices. In general, during mechanical clearance operations the IEDD operator can expect to find devices or component parts in the following scenarios:

1. Device/component part partially uncovered within hazardous area following mechanical action
2. Device/component part lifted and placed in general inspection area by mechanical plant
3. Device/component part in deminer inspection area.
4. Device/component part caught or stuck on mechanical plant (e.g. in bucket or on rake)

In all cases the EOD operator should be aware that the device may be damaged, **even if parts of the circuit have been cut it is possible that the device could function if disturbed**

1. **Device/component part partially uncovered within hazardous area following mechanical action.** This may occur during any phase of mechanical operation, particularly when “furrows” are left following ploughing, bulldozing or front-loader lifting. It is likely that only part of the device will be visible. If this occurs the EOD operator (or Team Leader) should make all efforts to mechanically lift the device from the ground using procedures outlined in SOP 4 (i.e. raking or grappling), and place the device in the mechanical/general inspection area. Once this has been achieved the device should be rendered safe in accordance with paragraph 2 (below).

The EOD operator must not attempt to use an RSP on the device while it is still in the ground. A device that cannot be seen and has been damaged by mechanical action is extremely hazardous. If the IED cannot be moved mechanically the EOD operator must refer up to the Operations Manager before conducting further action.

2. **Device/component part lifted and placed in general inspection area by mechanical plant.** This is likely to be the most common scenario, where an IED is uncovered during raking and lifted and placed in the inspection area by the plant operator. Once this has been done the following should occur:

- a. The plant operator informs his Team Leader of what he has found. He should then make an attempt to mechanically separate the main charge from the switches and power source. If this cannot be achieved, he should inform the Team Leader.
- b. The plant operator should then move the excavator arm out of the way, pointing in a safe direction. He should put on his PPE (inside the cab) and then exit the vehicle from the side facing away from the device into a cleared area. Then move to the Team Leaders location.
- c. The EOD operator should speak to the mechanical operator and Team Leader. He should assess what state the device is in and plan his approach/equipment accordingly.

- d. The EOD operator should move forward alone, in PPE and carrying his equipment. He/she should stop 5m away from inspection area place his equipment on the ground, and then move forward to confirm the devices location and condition
- e. The device will have been placed in a clear area, but the EOD operator must ensure there is a safe space to approach the device that is free of debris and soil.
- f. If the main charge is completely separated from the switch and power source the EOD operator should conduct detonator safety drills (see annex B) and then move the main charge to the explosives storage pit. Any non-explosive component parts should be placed in the appropriate storage area.
- g. If the main charge is attached to the switch but no power source is attached/visible the EOD operator should attempt to semi-remotely separate the switch from the main charge (wire cutter, J-knife etc), then conduct detonator safety drills as above.
- h. If the main charge is attached to a power source (or the power source and switch) the EOD operator should, in order of preference either:
 - I. Destroy the main charge in place (using a burner, donor charge etc.)
 - II. Use a disruptor to disrupt/separate the power source
 - III. Return to the ICP, lead the plant operator via a safe route to the excavator and instruct him to attempt separation of the main charge and power source
 - IV. With permission from the Operations Manager the EOD operator may attempt semi-remote separation of the power source and main charge (j-knife, wire cutter etc.). **Note: this procedure carries more risk than the above methods, and as such should only be attempted as a last resort. There must be no manipulation of components or wires at all while setting up this procedure.**
 - V. Once the EOD operator has confirmed that the main charge is completely separated from the switch and power source he/she should then conduct detonator safety drill as above.
- i. If there are multiple switches or power sources linked to main charges, then all of these should be separated from the main charge in accordance with the above.
- j. Once complete the EOD operator should then conduct a visual and detector search of the inspection area to confirm there are no remaining hazards

3. **Device/component part in deminer inspection area.** In this instance hazardous items may be uncovered in the deminer inspection area either by deminers inspecting and raking soil, or when a machine is preparing the deminer inspection area (see HALO Global IED SOP 4 annex E). If it is discovered by a machine, then procedures in paragraph 2 (above) should be followed. If it is discovered during a deminers visual or raking inspection, then the following procedures should be adhered to:

- a. Upon identifying a hazardous item, the deminer should stop work, place a red/white warning triangle and marking stick, and then inform his Team Leader. The team should then move back to the control point and inform the EOD operator.
- b. The EOD operator should speak to the deminer and Team Leader. He should assess what state the device is in and plan his approach/equipment accordingly

- c. The EOD operator should move forward alone, in PPE and carrying his equipment. He/she should stop 5m away from inspection area place his equipment on the ground, and then move forward to the edge of the inspection area confirm the devices location and condition
- d. There may be some uncleared ground between the EOD operator and the item (the deminer may not have completed the inspection and raking process). In which case the EOD operator may need to search a small working and access area in front of the device. The EOD operator should then apply the procedures in paragraph 2 f,g,h (above)
- e. Once complete the EOD operator should then conduct a visual and detector search of the inspection area to confirm there are no remaining hazards

4. **Device/component part caught or stuck on mechanical plant.** During mechanical clearance it a complete IED (or part) may become stuck on a machines bucket, rake etc. If this occurs the following should be adhered to:

- a. The plant operator informs his Team Leader of what he has found, and should move the machine to a cleared area nearby, (with enough space for potential EOD drills) or to the general inspection area and attempt to mechanically remove the item by moving the bucket/rake, then if required make an attempt to mechanically separate the main charge from the switches and power source. If this cannot be achieved, he should inform the Team Leader.
- b. The plant operator should lower the bucket or excavator arm onto the inspection area. He should put on his PPE (inside the cab) and then exit the vehicle from the side facing away from the device into a cleared area. Then move to the Team Leaders location.
- c. The EOD operator should speak to the mechanical operator and Team Leader. He should assess what state the device is in and plan his approach/equipment accordingly.
- d. The EOD operator should move forward alone, in PPE and carrying his equipment. He/she should stop 5m away from inspection area place his equipment on the ground, and then move forward to confirm the devices location and condition
- e. The EOD operator should then apply the procedures in paragraph 2 f,g,h (above). To avoid damaging the mechanical plant a burn may be preferable to a demolition in place, assuming it is safe to do so
- f. Once complete the EOD operator should then conduct a visual and detector search of the inspection area to confirm there are no remaining hazard



Example of device trapped on bucket (photo taken of training task)



Example of device entangled in debris switch (pressure plate - red), main charge (mortar - blue). Note that because the EOD operator cannot see for certain that there is no power source then he should assume the power source is still attached. (photo taken of training task)

