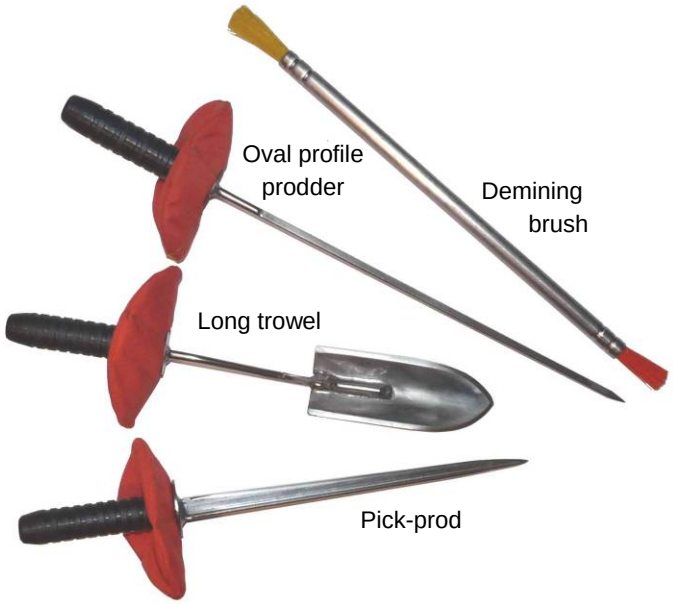
# Using the SD blast-resistant tools to investigate a metal-detector reading





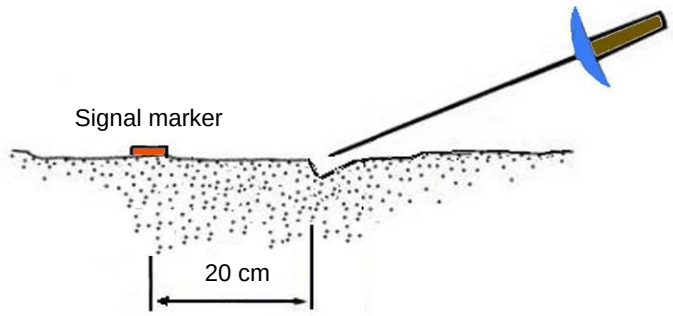
*Severe finger, hand and arm injury is the most common disabling injury during demining. This is because most accidents happen while a deminer is exposing a metal-detector indication or conducting area-excavation by removing the entire top-soil.*

To make severe injury less likely to happen, the following procedure can be used to investigate a metal-detector signal using SD blast resistant tools:

**1)** The deminer must begin by looking closely at the ground surface for sources of the metal-indication. If any metal is found, the deminer should remove the metal and check the position with the metal-detector. Throughout the investigation, the deminer should be constantly looking for the source of the signal.

**2)** When magnets are available, the deminer should pass a magnet over the ground surface where the detector indicated. The magnet-clip attached to the **SD Long trowel** is ideal for this, as shown in the photograph alongside. The signal marker may be temporarily removed while a magnet is used. After a magnet is used, the deminer should check the area with a metal detector and place the signal marker again.

**3)** An investigation should be started by prodding the ground at least 20 cm back from the signal marker.




In most ground, the prod will not penetrate more than a few centimetres. The deminer must not apply excessive pressure to make the prodder go more deeply into the ground. When the **SD Oval profile prodder** is used, the deminer should rotate the prodder blade to make a round-hole in the ground. The oval shaft of the tool will then only touch the hole on two sides. The reduced ground friction should mean that the deminer can prod more deeply with no more pressure.

When the prodder will not penetrate 3cm, or the deminer is tempted to use both hands, the deminer should use the **SD Pick prod** or **Two-handed excavator** to break the ground surface.

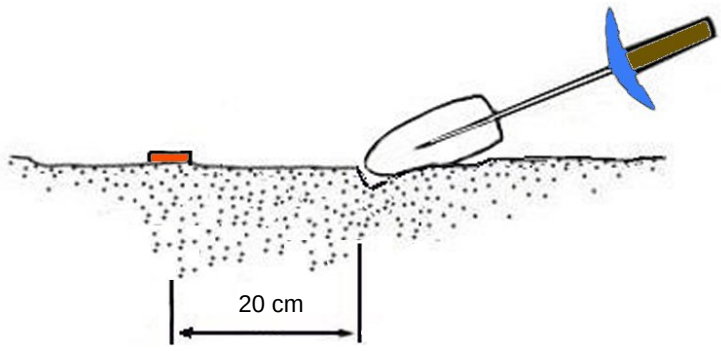
## CAUTION!

Using two hands, with one hand on the blade, puts the hand on the blade dangerously close to any explosion. Use a tool designed to dig in hard ground, then work forwards slowly using gentler tools.

Sometimes the ground has a crust with softer soil underneath. Sometimes the ground becomes harder as the investigation gets deeper, and the use of tools designed for hard ground is needed. The photograph alongside shows a deminer using the **SD Two-handed excavator** in Sri Lanka.

The ground should be prodded or broken-up over a width of excavation equal to the width of the anticipated threats at the site. If AP mines are expected, a width of 15 cm is recommended. If AT mines are expected, a width of at least 30 cm is recommended.

**4)** The ground that has been loosened with the prodder should then be removed with the **SD Long trowel**.



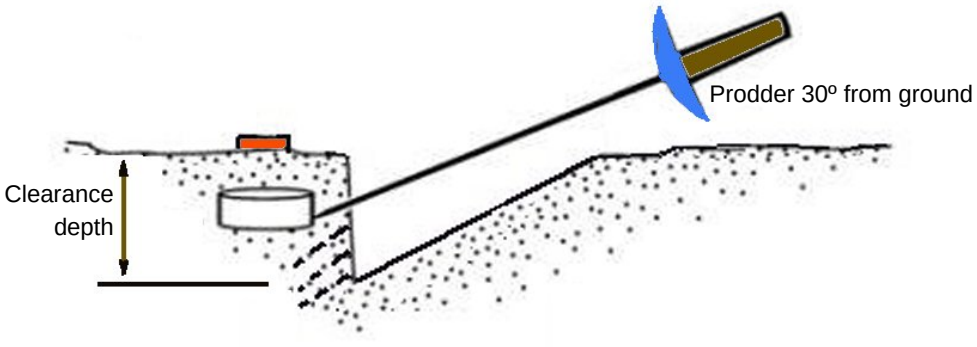
Whenever metal is found during the excavation, with the magnet or by eye, the deminer should check the position of the original indication with the metal-detector.

The deminer should also check with the metal-detector whenever soil is moved aside. If the signal has moved, it was made by a fragment of metal in the soil that was moved.

**5)** Tip the loose soil over the blade of the **SD Long trowel** as shown on the right If you are using the optional magnet clip, the strong magnet will attract any metal with iron in it. If you find any metal, use the metal-detector to see whether it still signals on the ground. If it does that, the signal investigation is complete.

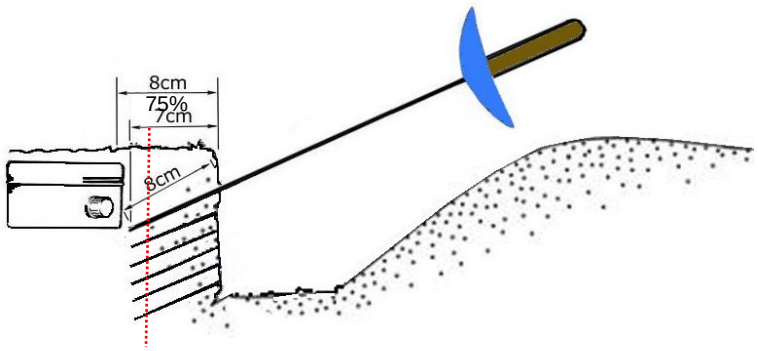
Most of the fragments in a minefield have an iron content, including bullets and bullet casings. The only non-magnetic metal in the picture below is the ring-pull from a can.

**6)** Steps 3 and 4 should be repeated as many times as necessary to create a sloping hole at least 15cm wide advancing towards the signal-marker. The depth of the hole should reach the required Clearance depth at the site BEFORE the marker is reached.




**7)** The side of the excavation closest to the marker should be approximately vertical. The deminer should prod this from the bottom upward at a spacing of 2 cm. The prodded earth can then be removed with the **SD Long trowel**. When the prodder hits an obstruction, the prodder should be used to feel for the sides of the obstruction and so estimate its size. The **SD Long trowel** should then be used to carefully expose the obstruction.

In soft ground, it may be possible to push the **SD Oval profile prodder** a long way into the ground. The prodded ground can then be cut away with the trowel with complete confidence that there is nothing hidden there. Only the ground searched with the prodder should be cut away.




The deminer should not cut more away than 75% of the soil that has been prodded. The length prodded is NOT the distance ahead of the excavation face that can be safely removed with a trowel. The picture above shows a prodder inserted 8 cm into the ground. Because of the angle of the prodder, the prodder has only reached 7 cm into the unknown ground. In this example, a deminer who cut 8 cm of soil away with the trowel would press on the edge of a mine.

After prodding the face of the signal-investigation from the bottom upwards, the deminer should insert the prod a final time and grip the blade to record the depth before withdrawing it. He/she should then estimate three-quarters of the length and mark the ground ahead of the hole lightly with the prodder tip. The ground up to that mark can then be cut away safely with the **SD Long trowel**.

**8)** If nothing is found at the signal-marker, the deminer should check the position of the indication with the metal-detector. When the metal-detector continues to signal over the area, it may be necessary to dig more deeply. The Supervisor should decide this based on the Task Risk Assessment and any pattern of mines that is known. The Supervisor should consult his/her superiors over any uncertainty. Generally, when a mine is missing from an anticipated pattern and there is a metal-detector signal near where the mine was expected, the depth of excavation should be increased until the source of the signal is found.

When searching more deeply, the deminer should start excavating again, beginning further away from the indication and extending the slope of the hole so that any device will still be approached from the side.

When a mine/device has been found, the deminer should use the **Oval profile prodder** and the **Demining brush** to GENTLY expose as much of the device as the SOPS require.

When the device has been suitably exposed, the deminer should follow the actions detailed in other SOPs.

.

***All SD recommended procedures are derived from SOPs used in the field. However, SD can accept no responsibility for their safety or suitability. We recommend that they be changed when necessary to comply with your organisation's safety procedures.***

*For more information, contact Trevor Thomsen or Oddia Mabika at secdev@mweb.co.zw*
*Tel: +263 4 487064 / 486405 / 486317 Facsimile: +263 4 486885 www.secdevinc.com*