

Q: "If prodders are inadequate, what do you think is the best anti-personnel mine excavation tool?"

The question is loaded by the suggestion that there is only one "best" tool. Many demining groups prefer to use a single tool, but this is a cheap and lazy option not chosen by anyone genuinely concerned about deminer safety. When only one tool is used, a short bayonet is the common choice. This is because it is usually cheaply available, hard-wearing and can both slide into the ground and scrape it away. Its downsides are that it places the deminer's hand far too close to any detonation and is far from efficient when digging to the clearance depth in hard ground. In accidents, its hard plastic handle can also shatter and cause severe body injury.



My personal equipment choice would always be well designed rakes used in a disciplined way. Current accident evidence shows that the REDS rakes are by far the safest and most thorough method of investigating a metal-detector reading.



But if management bias (almost always reverting to traditional western military training) means that rakes are not an option, I would need at least two excavation tools – the first would be a ground-breaker and the second a pick-scraper. A third tool would be a magnet strong enough to attract fragments, rust and battle debris that may have made the metal-detector signal.

The ground-breaker is used to break up hard ground and dig to the required depth a distance away from the metal-detector signal and the pick-scraper is used to extend that excavation forward by crumbling away the face of the hole closest to the signal (from the bottom upwards) then scraping the spoil aside. Sometimes the ground is so hard that the face of the excavation needs a robust tool, but in soft ground a slim prodder may sometimes suffice.

Ground-breakers widely in use around the world include pick-axes, mattocks, spades and purpose designed tools. What they all have in common is that they allow two-handed use, so allowing greater force to be applied when breaking the ground surface and reaching the required depth. Some are better in rocky ground and some have a wider blade that allows them to scrape spoil aside. None are in themselves dangerous, but the manner in which they are used is sometimes simply stupid.

The best ground-breaking tools are designed to stay in one piece in any AP mine accident and to keep the users hands well away from the ground.



This purpose designed Croatian mini-pick is good, cheap and simple. Made locally, the lump on the end is a neodymium magnet. The pick is used before a bayonet and its flat cutting face can also double as a scraper.



This is the purpose designed MIT excavator. It is not easy to use to scrape spoil away but is easy to use accurately, selecting the point of ground impact with precision. The design minimises the energy required and guarantees that both hands are a distance from the ground while protecting the closest hand. I have used both of these tools and recommend them, but I would not use a short bayonet as a pick-scraper afterwards.

This is my favourite pick-scraper.



The blade can slide into the ground between stones, roots and obstructions. When twisted, it breaks the ground up. Like many deminers, I have generally used my left hand to lightly scrape spoil away, so this bayonet's poor performance as a scraper is not very relevant to me. Its length keeps my hand well away from any detonation and it is uncomfortable to use a second hand resting on the blade. In real demining accidents, these old bayonets have bent rather than shattered. My 18" bayonet cost \$5 twenty years ago but it is now "collectable" and sells for more than \$100, so cannot be realistically bought for deminers.



A robust pick-prod is my second choice to break up the face of the excavation.

The third tool I favour is a trowel-scraper with a neodymium magnet attached – used to move the spoil away while the strong magnet attracts any ferrous material that may have made the metal-detector signal.



These fragments are often ground-coloured, so impossible to see, and the magnet can speed up the discovery of a false alarm by a great deal. (Being metal, these are not really “false alarms” but they are not mines, so you know what I mean).

My opinion over hand-tools has met with the approval of deminers all over the world and has influenced my designs of blast-resistant tools. I did try to design an easily made and low-cost alternative to my 18” Lee-Enfield bayonet but without success – so I have had to leave that to the design engineers out there.

I did include an improved “low-friction” prodder in my set because that is what the ex-soldiers managing demining wanted. I think it is the best prodder out there, but the accident record proves beyond all reasonable doubt that no one should be relying on a prodder as their main excavation tool.

My designs are free to anyone. The only manufacturer at present is [Security Devices](#) in Zimbabwe.

Design rules to apply when making your own are [available here](#).

