



Bogged down.



IMAGE of ANFO blast test by BCB

Progress with the counter-offensive is painfully slow. And for good reason. Every inch has to be cleared of mines, often by “bellies on the ground”; but there are some innovative solutions available.

By Andrew Howell MBE, MD of BCB Inter. Ltd.

With political and public pressure mounting from Ukraine’s allies, for “quick successes” with the counteroffensive, Ukraine has shown their plan is measured and sensible. They are playing the longer game, looking to decisively expel Russia from its territory. This should be welcomed by the west, as the Russian bear needs to be given a bloody nose to remove its threat not just for the good of all, but for the great good of the planet. Russia after all is perhaps also the worst for climate destruction and biodiversity loss. And the effect of the war on global warming is enormous, but often forgotten in the fog of war.

The Russian forces have constructed over the last half year, layer after layer of defensive lines where they have hidden land mines, tank traps, trenches and dragon`s teeth, across the approximately 750-mile-wide front line. Some of the three or four lines of trenches seen from the air, are worthy of Passchendaele or Verdun, from World War I. Perhaps the Russian`s second and third defensive lines, are instructed to shoot anyone - Ukrainian or possibly even Russian troops - which come from in front of them. Giving Russians in the front-line no option to retreat, but to fight to the last.



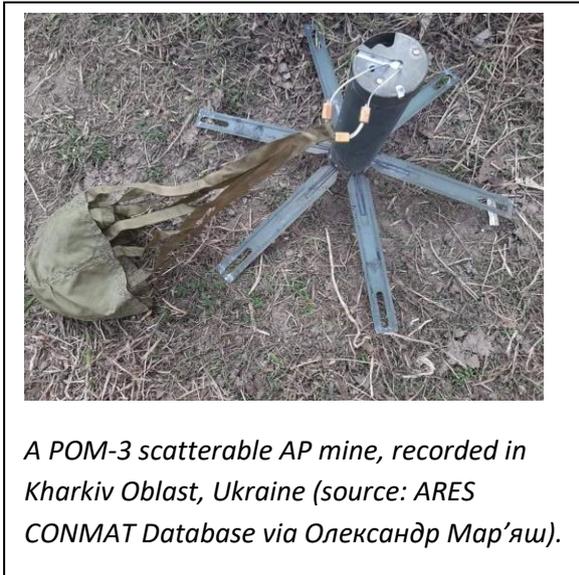
But perhaps the biggest threat baulking the Ukrainian counteroffensive, is the plethora of differing landmines, trip wires and other booby traps, for the combat engineers – the sappers - trying to find a safe path though. It is no easy task.



An area in Ukraine, almost the size of the UK, approx. 250,000 sq Km, has potentially been contaminated with landmines and unexploded ordnance, by Russia. Russia isn't a signatory to the 1997 Mine Ban Treaty that prohibits antipersonnel mines.

Map of Ukrainian territories that could potentially be contaminated by explosive objects.

The dangerous process of finding and disposing of land mines will take years. In



Vietnam, more than 100,000 people have been killed or injured by land mines and unexploded ordnance since the U.S. war ended there in 1975.

Numerous methods of landmine delivery methods have been seen from Russia; hand-placed, air dropped, mechanically laid, and remotely delivered. Several new types of landmines have also made their combat debut; including mines that have been produced as recently as 2021.

Russian forces have also placed many victim-activated booby-traps as they retreat from positions taken during the

initial phase of the invasion. These traps can function as antipersonnel mines when the fuse that is used is activated unintentionally by a person.

Human Rights Watch has confirmed that seven different types of mine have so far been identified, including POM-2 and POM-3 mines. These are indiscriminately dropped by aircraft, drones or fired from specialized ground launchers.

The POM-3—never before deployed in combat prior to the 2022 invasion—has a seismic sensor that triggers the mine when disturbed by footsteps. Once tripped, the mine jettisons an explosive payload to roughly head-height that then detonates, expelling shrapnel that is lethal out to around 15 meters.

Larger hand-emplaced TM-62 series anti-vehicle mines are also among the most frequently used.



Unexploded ordnance (UXO) is compounding this mine problem, albeit unintentionally. A lot more unexploded munitions may soon land on the battlefield, with the recent announcement of the supply of cluster munitions from the United States. Even though the Pentagon estimates its own cluster bomblets have a dud rate of less than 3%, the average reported dud rate is 20%, with the Russian dud rate being up to 40%.

Even though the Ukraine war is dominated by modern weapons, due to the minefields and the extensive Russian defences, the counteroffensive is bogged down by tactics more reminiscent of 20th century conflicts. Cyber, electronic warfare and some of the most sophisticated weapons today are brought back down to earth by the mines. As General Sir Patrick Sanders said in 2022: “you can’t cyber your way across a river.”

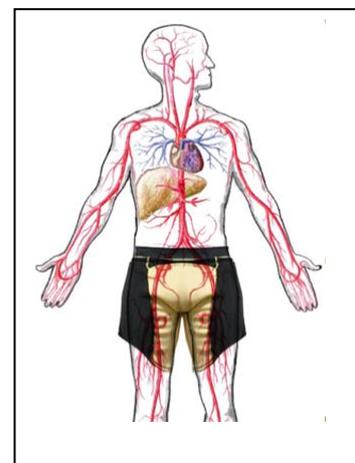
“Boots on the ground”, used to be catch phrase of military experts, could perhaps be re-worded for Ukraine, to “bellies on the ground”. The West’s doctrine on clearing the mines would be to send in protected vehicles; impossible in Ukraine as they don’t have such vehicles in any quantity, and where they do have them and deploy them, they are targeted by the Russians as top targets; as the Taliban did in Afghanistan. The mine clearance vehicles are large, heavy, and noisy. It signals to the Russians where the Ukrainians are focusing their forces, and they respond accordingly.

So, the sapper units, often in groups of just four people, are sent in to clear the paths. As walking with a metal detector is asking for trouble, as they are in the firing line, they must wait for low light and crawl on their bellies. They rely on their night vision devices to help spot the mines, or feel for them with their mine prodders, at dawn or dusk. And when they do reach the Russian trenches, these must also be cleared by hand. Machines are too big. Dangerous and difficult work.

Frightening stuff. You or your colleague alongside you could miss one, or trigger it when clearing it, you will have people ahead of you trying to shoot at you and drones buzzing overhead looking to rain artillery shells down on you. These sappers have little protection. Though some are now buying, or are being given by charities or their wives/girlfriends, ‘Blast Boxers®’. Originally developed by UK based defence manufacturer, BCB for the Afghanistan war.

Injuries

The nature of the injuries inflicted by mines are severe and harrowing. Conventional body armour that protects the soldier’s torso doesn’t protect from the upward blast, which penetrates the body from below, causing life-changing injuries to the pelvic and groin area, and life-ending severe damage to the soft internal tissues of the colon and bladder. These are often impossible to repair or replace.





Critically, the femoral and perineal arteries are located in the groin and inner thighs. Preserving as much of these arteries in the upper leg/s as possible enables a tourniquet to be applied in the field, helping to stop the victim from bleeding to death in a matter of minutes, if one or both crucial arteries are ruptured.

The age profile of the service personnel who suffer these devastating injuries means that there is also the possible additional psychological trauma of not being able to have children.

Protection

Historically, groin blast protection has always been uncomfortable to wear, is heavy, cumbersome and hinders mobility considerably. Anything that helps dismounted soldiers and civilians alike to help reduce some - not all admittedly - of these threats safely, without adding too much to the wearer's burden, is literally saving lives.

The 'Blast Boxers®', as they are fondly known, offer groin protection, while being extremely comfortable to wear next to the skin, without adding too much weight, bulk or thermal burden to the wearer. They can be worn by both men and women.

The generic term now used for this next to skin protective layer, is "Tier 1 Ballistic Underwear". They have helped to save numerous lives and prevent more serious injuries from mines and other UXO worldwide. The 'Blast Boxers®' are made of a special soft flexible woven Aramid (Kevlar®) material. Kevlar® is well proven as a ballistic protective fabric and is used by most forces worldwide as the best, most practical material for soft body armour.

In addition to providing the best protection for the comfort and weight, in an under garment, the Blast Boxers® offer a multi-layered protection capability for both the groin and femoral arteries areas. They are fire retardant, are very comfortable, anti-odour, machine washable, and are supplied and used by many NATO forces.



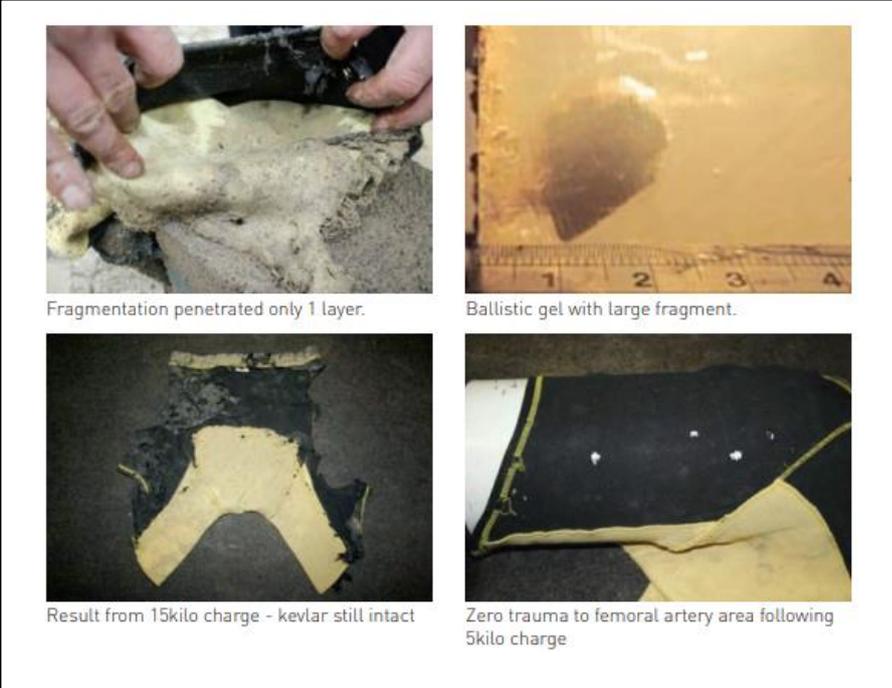
BCB Blast Boxers®.

As with any terrific new technology, the Blast Boxers® have now been widely copied. There are some silk protective shorts from China, but these are as protective as the BCB Kevlar® garments. Silk is not normally used for ballistic protection in body armour, as it's ballistic performance, is not as good and it degrades especially quickly when washed. Underwear needs washing; especially in the front line.

The silk shorts offer between 16% to 34 % less stopping power, depending on if they are washed or not, and are over twice the weight of the British 'Blast



| Test | Blast Boxers® Penetration velocity (m/s) | Silk underwear. Penetration velocity (m/s) |
|--------------------------|--|--|
| Weight @ (medium) | 150 gram | 300 gram |
| Unwashed | 236.89 | 203.31 |
| Washed | 244.12 | 181.86 |



Kevlar® is a registered trademark of DuPont™ and Blast Boxers® is a registered trademark of BCB



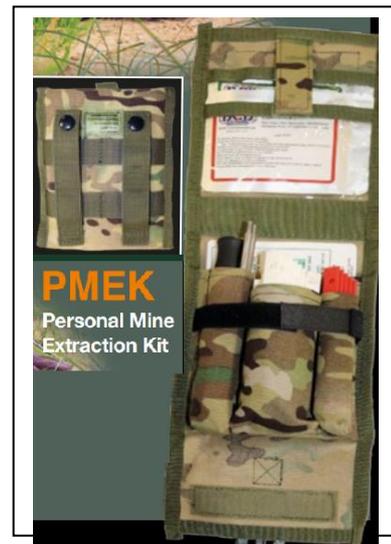
The BBC reported on 3rd July 2023:

“Mines are terrifying. They scare me more than anything else,” said Artyom, a 36-year-old soldier from Ukraine's 108th Territorial Defence Brigade. Two days earlier, two of his colleagues had stood on "petals" - small, green, anti-personnel mines - that had recently been scattered across a field by Russian rockets.

"Our guys were experienced. But it's hard to have eyes everywhere. Both have leg amputations. One leg each. We have [mine] injuries after every fight," said Artyom, a trained sapper.”

Detection

Sappers cannot use electronic mine clearance as they are in the “firing-line”. Some of the Ukrainian soldiers have been issued with a small Personal Mine Extraction Kit (PMEK), which is lightweight and can be carried by every soldier; sapper or infantry. Designed again for the Afghanistan war it can be deployed and ready in seconds, and contains all the key components troops needed to find and mark mines; day and night. With Ukrainian instructions.



Larger de-mining vehicles are in such short supply in Ukraine now, and are so valuable, that they are being seen as key targets by the Russians. Hence, despite modern machinery, the primary identification and clearing of the mine fields is back to the individual, often laying on his belly, inching forward.



Marking.

Once a mine is found, the new BCB AIM marker is a quick to deploy and a long lasting, marking device. Each tiny waterproof marker lasts for up to 36 hours



marking day and by night. It will mark the safe way forward and the dangerous routes.

This small (165mm x 26mm x 32mm) handheld, lightweight (65 grams) device, will deploy up to 20 tiny but bright markers, within seconds. More importantly, as it is intuitive to use it is very practical, essential when you are in not only the firing line, but also a heavily mined, “killing zone”. As the markers are so small 20mm x 15mm x 5 mm and lightweight at 2 grams, approximately 20 AIM markers can be carried for the equivalent size and weight of one 6 inch (15 cm) chemical light stick.



Available in six colours, and an infra-red option, they are recyclable, reusable and biodegradable, so it can be left in the field. British made, like the other BCB innovations.



A recent British military report concluded:

“The AIM and associated dispensing kit are innovative and effective. It has provided the man on the ground multiple methods of lighting up, line of departures, route of travel, even individuals. The AIM is a viable solution as a replacement for the (lightsticks), it is brighter and lasts for much longer.”

Eradication.



Another innovation available from the BCB range, which will help this dangerous and tedious mine clearance work, is the new ROCK (Rapid Obstacle-Clearing Kit) Stick. Each 2-meter-long rod can be unrolled in seconds and added together to make a longer extension. It can then be triggered

to clear placed obstacles, such as mines, trip wires and to breach, fencing, walls, doors, barbed wire, and other battlefield obstacles, quickly and effectively, in one go.

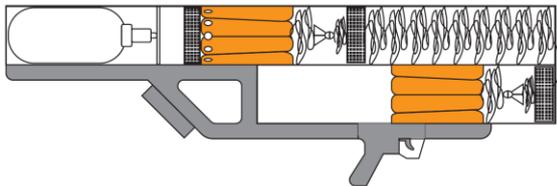
This item is easily portable, quickly deployable, and highly portable. Like a modern lightweight Bangalore torpedo, used so effectively from WW I. Unlike the WW I version though, this modern equivalent is very small and lightweight. It is also safe to carry as the charge will only be activated once needed.





Ideal for sappers, engineers, and infantrymen alike it comes preassembled and so is quick to use.

Using Newton`s second law of motion, the air powered BCB Barracuda, will launch a 40-meter det line, which can then be detonated, clearing a path through mines and UXO. The Barracuda is hand- held and can be quickly and easily re-charged with compressed air and re-loaded within a few minutes. It will also clear other smaller physical obstacles, like barbed wire and fences, obviating the need for the sappers to put themselves in such a dangerous and frightening position.



BCB have also designed and make two larger versions. The Buccaneer launcher, (shown here) will fire, also using only compressed air, a det line up to 100 meters. The larger WBS will fire over 300 meters.



The Washington Post reported on 15th July 2023 that:

“A senior Ukrainian official, who, like others, spoke on the condition of anonymity to discuss sensitive military matters, said Kyiv received less than 15 percent of the quantity of demining and engineering materiel, including MICLICs, that it asked for from Western partners ahead of the counteroffensive. Some of that equipment arrived just last week, the official said.”

Defense Minister Oleksii Reznikov and Zaluzhny told The Post that they have informed their Western counterparts that they urgently need more mine-clearing systems, such as Bangalore torpedo explosive charges. Ukraine has held back some of the brigades and Western weapons prepared for the counteroffensive as it attempts to penetrate the minefields.

These man-packable, new innovations will help “level the playing field” to improve the many difficult hard yards ahead, the Ukrainians will have to fight for. All gains will still be slow and hard-won, through the many layers of mines and other defensive



measures the Russians have prepared, but there are solutions available to help the brave Ukrainians against the most callous of defences.