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INSTANT OBSTACLES: RUSSIAN REMOTELY DELIVERED MINES

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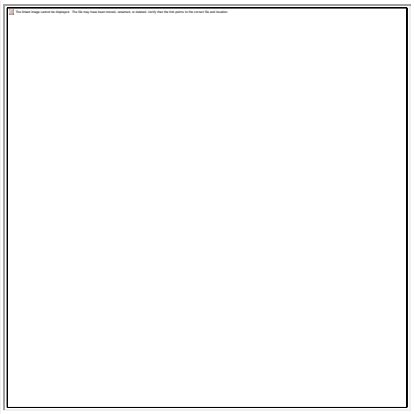

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The Soviet Army used large quantities of land mines to support military operations. Accounts vary, but all agree that the Soviets employed millions of mines in Afghanistan. General Gromov, who commanded the Soviet 40th Army during the withdrawal, states that the 40th Army turned over 613 minefields (with records) to the Afghanistan Army before it withdrew from the country.[1] These standard mine fields alone could easily include well over a million mines.[2]

The Russian Army views mines as an essential element of both offensive and defensive operations. However, manually-emplaced conventional minefields are labor-intensive and require the expenditure of more time than may be available. Therefore, the Soviet Army developed and fielded several models of towed and tracked conventional minelaying vehicles to allow engineer forces to quickly mine an area just prior to or during the battle. In recent years, the Soviet military recognized the benefit of remotely delivered land mines to rapidly project minefields onto the battlefield. Remote delivery reduces the manpower requirement for minelaying as well as minimizes exposure of the minelaying equipment to enemy fire. Once emplaced, these minefields can instantaneously affect the tactical situation and degrade the enemy's reaction time to the sudden appearance of the obstacle.

The Russians have fielded a variety of remotely delivered mine systems which can be employed from jet aircraft, helicopters, multiple rocket launchers, ground vehicles or trucks, as well as the forward parapet of a fighting position. The Russians are showing and selling these systems in arms shows around the world. Therefore, the U.S. military professional needs to be aware of these Russian systems whether contending with a force which has bought these systems, or working with the Russian Armed Forces in a joint or multi-national mission.

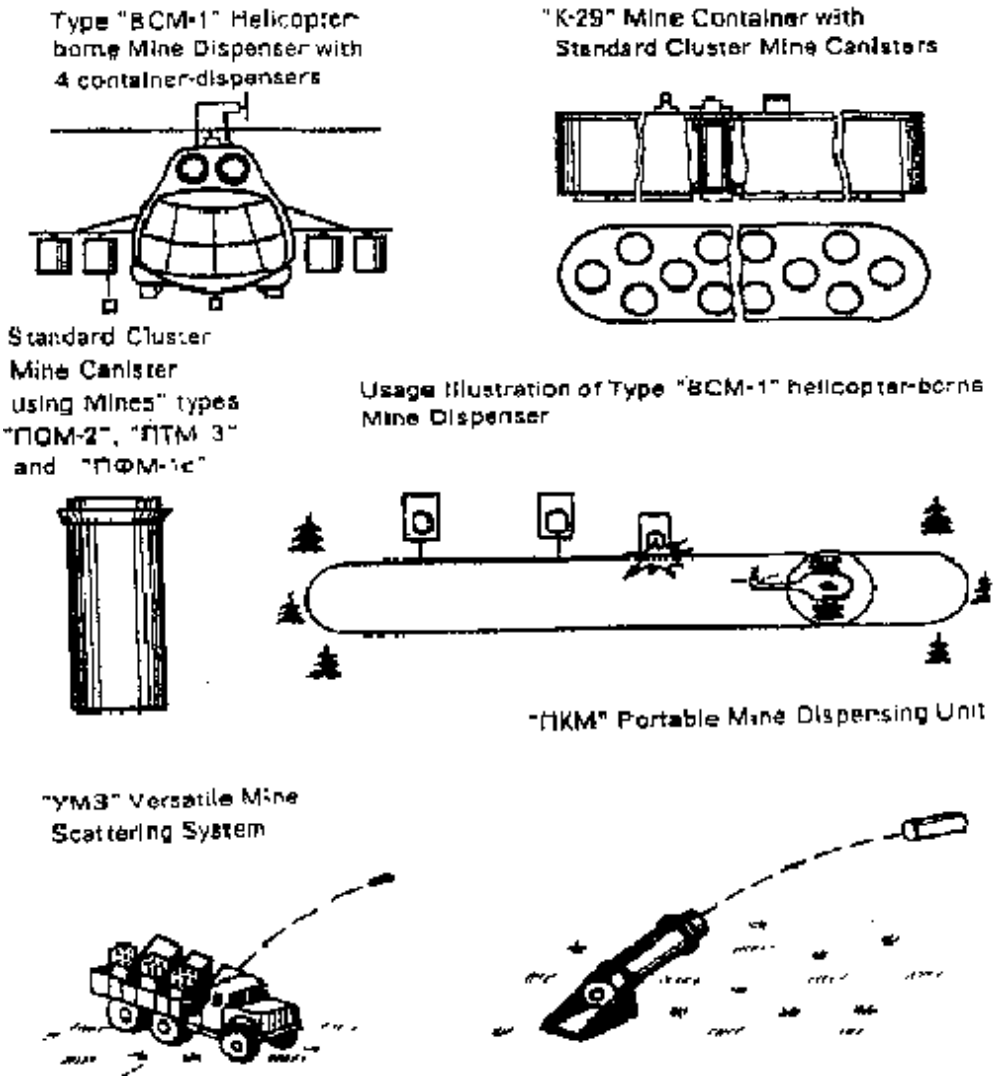


Figure 1 - Russian illustration showing: (top row) VSM-1 and K-29: (middle) POM-2, PTM-3, PFM-1C cannister and VSM-1 pattern; (bottom) UMZ and PKM systems.

Remotely-delivered mines [scatterable mines in US terminology] are land mines laid without regard to classical patterns which are designed to be delivered by aircraft, artillery, missile, ground dispenser, or to be hand thrown.[3] Frequently, these types of land mines will also incorporate self-destruct or self-neutralization features to control and limit their active duration once emplaced. The Russians use remotely delivered or scatterable mines to reduce enemy mobility, inflict losses and to create the conditions for the destruction of an enemy force.

Scatterable mines also have a psychological effect on enemy morale. Scatterable mines can be laid close to friendly positions and covered by friendly fire or laid deep in the enemy territory. Minefields created by scatterable mines lack precise boundaries or a definitive mine emplacement pattern, and generally remain on or near the surface of the ground. The Russians prefer to retain the element of surprise and therefore, employ scatterable mines immediately before combat or during the course of the battle. When dispensed, these minefields are generally laid immediately in front of attacking, reinforcing, and withdrawing enemy troops, or may even be emplaced directly upon enemy formations. Scatterable mines are an effective way to disrupt or control an enemy force, to isolate or block a moving reserve, and to prevent the displacement of enemy artillery once targeted for counter battery fire. Scatterable mines are also an effective way to close a breach in a minefield or shutdown a chokepoint.[4]

The Mines

Russian scatterable mines are made in both antitank or antipersonnel types. The PTM-3 and PTM-1S are the standard Russian antitank scatterable mines whereas the POM-1S, POM-2S, and PFM-1S are the Russian scatterable antipersonnel mines. Scatterable mines with self-destruct or self-neutralization features generally use the "S" designator after the mine nomenclature in order to distinguish it from the basic version which omits this characteristic.

The PTM 3 is the latest generation scatterable antitank mine from the former Soviet Union. These mines are deliverable by the UMZ vehicle mounted mine-scattering system, the VSM1 helicopter mounted mine scattering system, and the PKM portable mine scattering system. The mines have a unique four linear charge warhead which will penetrate a tank's belly and destroy the running gear no matter what the mine's orientation. This rectangular shaped mine incorporates a magnetic fuse system and an antidisturbance device.[5]

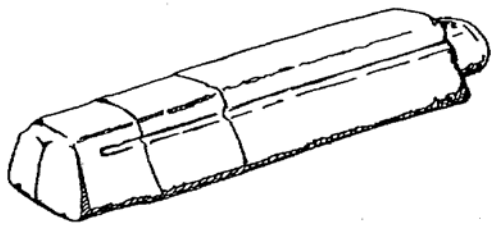


Figure 2 - PTM-1 (or PGMDM) antitank mine

The PTM-1S (formerly called the PGMDM) is a prism shaped, first generation Soviet scatterable antitank mine similar to the German AT-1. It can be dispensed by multiple rocket launcher, fixed- and rotary-wing aircraft, the UMZ vehicle mounted mine-scattering system, the VSM1 helicopter mounted mine scattering system, and the PKM portable mine scattering system. It is a pressure activated blast mine with a self-destruct timer that can be preset to one of 12 settings, which determine self-destruction from 0 to 24 hours.[6]

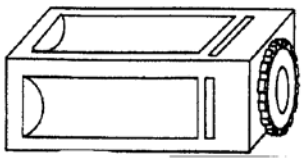


Figure 3 - PTM-3 scatterable anti-tank mine.

- The POM-1S is a former Soviet copy of the US BLU-42B scatterable mine. It is a circular antipersonnel mine which dispenses four trip wires, 6 meters in length. The fuse is electromechanical with a tilt actuated mechanism (ball switch), electromechanical remote arming and self-destruct mechanisms. Disrupting or tilting the mine by

moving it or pulling the trip wires will trigger the internal ball switch causing it to electrically detonate the mine. This mine uses fragmentation as its casualty producing kill mechanism.[7]

The POM-2S is significantly different from the other Soviet produced scatterable mines, in that it uses self-erecting legs to properly orient the mine once emplaced. Once emplaced, POM-2S erects itself and then dispenses trip wires from its upper fuse assembly. Pulling on the trip wires functions the fuse causing the mine to detonate and dispense the ballistic fragments in a 360 degree area around the mine.

Figure 4 - POM-2S anti-personnel mine

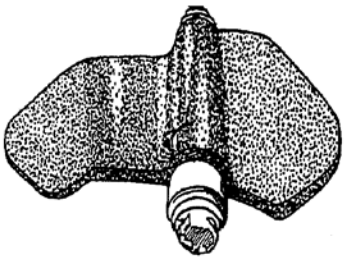


Figure 5 - PFM-1 anti-personnel mine.

The PFM-1S was used by in Afghanistan and provided the first confirmation that the former Soviet armed forces had scatterable antipersonnel mines within their inventory. This small mine is a reverse engineered copy of the US BLU-43 mine which was used in Southeast Asia. The PFM-1 has a green or sand-brown plastic mine casing, a pressure activated fuse, and blast effects to cause personnel casualties.[8]

Scatterable mine containers hold the following quantities of each type mine: 64 PFM-1S, eight POM-1S, four POM-2, three PTM-1S and one PTM-3.[9]

Vehicle Mounted Scatterable Systems

There are three UMZ truck-mounted scatterable mine systems in each full TO&E regiment.[10] UMZ stands for *universal'ogo minnogo zagraditelya* [universal mine-layer]. The UMZ consists of six firing modules mounted on the back of a ZIL 131 truck. Each module has thirty firing tubes, so the UMZ has 180 firing tubes. Depending on the type minefield desired, the UMZ can lay from 180 to 11,520 mines without reloading. The UMZ can launch an antitank or antipersonnel minefield 30-60 meters from itself while the truck is driving from 10 to 40 kilometers per hour. It takes two men from one and a half to two hours to reload the UMZ. One UMZ can lay a three row minefield stretching from 150 to 1,500 meters long, depending on the mine that is used.[11]

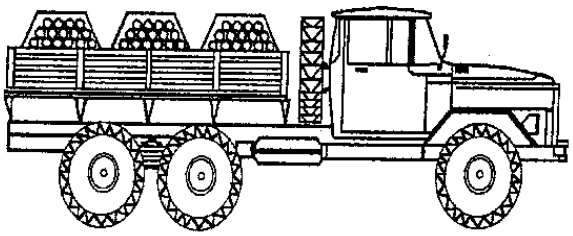


Figure 6 - UMZ mine scattering system.

The UMZ vehicles are usually deployed together as a mobile obstacle/minelaying detachment. The detachment commander is alerted by radio and moves his detachment to the site at 10-25 kilometers per hour. When the detachment comes to the designated area, it moves on a route parallel to the required minefield. The control panel in the truck cab releases the mines. The Russians use the UMZ to lay minefields to protect subunit positions, flanks and the boundaries between subunits. UMZ-laid minefields also cover firing lines and gaps in combat formations. The UMZ can quickly close breaches in existing minefields and increase the density of mines on armor avenues of approach.[12]

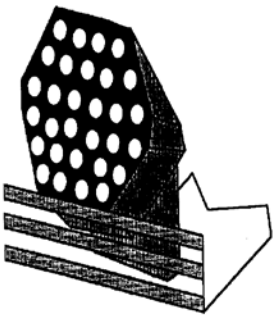


Figure 7 - UMZ launcher

An additional advantage of the UMZ is that it gives the engineer forces the ability to re-seed or reinforce an obstacle without the necessity of entering or crossing the obstacle itself. All other engineer minelaying techniques (manual or conventional mechanical minelayers) require the engineers to enter the obstacle and travel over the same area the mines are to be emplaced. On the other hand, the UMZ allows engineer forces to traverse the perimeter of a minefield or complex obstacle and project antitank or antipersonnel mines into it. Additionally, the UMZ allows the engineers to remain on the friendly side of an antitank ditch, river, canal, embankment, ravine or any kind of linear obstacle and project land mines onto the enemy side. This allows friendly units to cross to their side of the obstacle via a bridge or whatever, while permitting the engineers to seed the far bank with land mines after the bridge has been removed or destroyed.

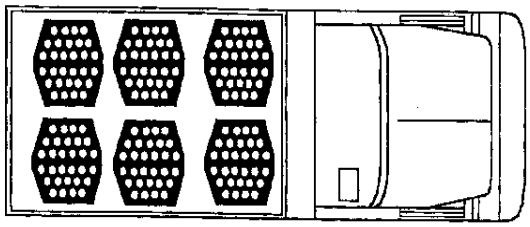


Figure 8 - UMZ top view.

Delivery by Fixed-Wing Aircraft

Bombers and fighter-bombers can lay remotely-delivered minefields in the operational depths (up to 250 kilometers).[13] For cross-FLOT operations, aircraft are only used to deliver ordinance that can not be delivered by indirect fire. This minimizes the risk of losing the aircraft to ground fire or surface-to-air missiles unless absolutely necessary. Therefore, aircraft are generally used to deliver ordinance such as submunitions and scatterable mines beyond the range that their artillery systems are capable. Ground attack aircraft, such as the SU-27 FROGFOOT, will lay these minefields in the enemy's tactical depths. High-performance aircraft can lay mines at a speed of 400 to 800 kilometers per hour at an elevation of 50 to 200 meters. Aircraft-delivered scatterable mine canisters are dropped on parachutes. The canisters are set to burst open at a predetermined height to scatter the mines.[14]

Delivery by Helicopters

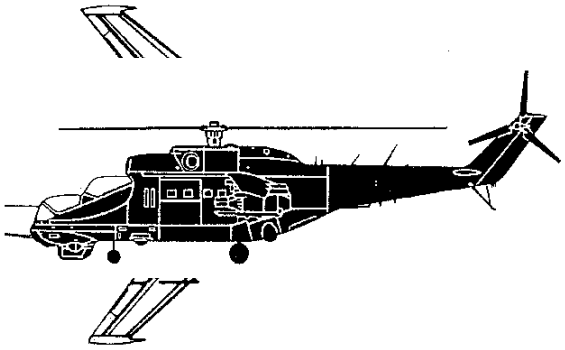


Figure 9 - SU-27/FLANKER B, capable of laying minefields.

Helicopter minelaying is normally conducted over friendly territory, such as along flanks or in rear areas. When helicopters are supporting an airborne or air assault landing, helicopters may also lay mines on enemy territory. The Mi-8 HIP and Mi-24 HIND helicopters are most commonly used for helicopter mining. The speed of minelaying can vary from 20 to 300 kilometers per hour and can take place at an altitude of 30 to 100 meters.[15] The Russian BCM-1 heliborne mine dispenser system has four K-29 Mine containers which hold the standard clusters of POM-2, PTM 3 and PFM-1S mines.[16]

Missile Artillery Delivered Scatterable Mines

The preferred method of remotely delivering scatterable mines is through the use of multiple rocket launcher systems (MRLS). These systems offer the capability to rapidly project a fairly large minefield almost anywhere on the battlefield without the necessity of risking a carrier vehicle to deliver the ordinance to its intended location. MRLS provide the ability to reach across the length and depth of the battlefield, on both sides of the FLOT, in order to emplace minefields. Additionally, the MRLS offers significant advantages over the use of cannon artillery frequently used by western forces. For instance, missile warheads can generally carry more submunitions than most cannon rounds. Secondly, since multiple missiles can be fired from each vehicle, MRLS batteries and battalions can rapidly complete the minelaying mission, thus freeing them to relocate and accept further fire missions. On the other hand, cannon artillery can only fire one round per vehicle. This requires howitzer batteries or battalions to continue firing over an extended period in order to achieve an equivalent minefield size and density. During this period they are more susceptible to targeting and counterbattery fire, and are unable to accept additional fire missions. Lastly, the shock loads and G-forces on missile components and submunitions is significantly less than those suffered by cannon rounds.

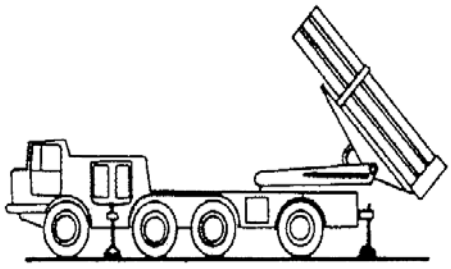
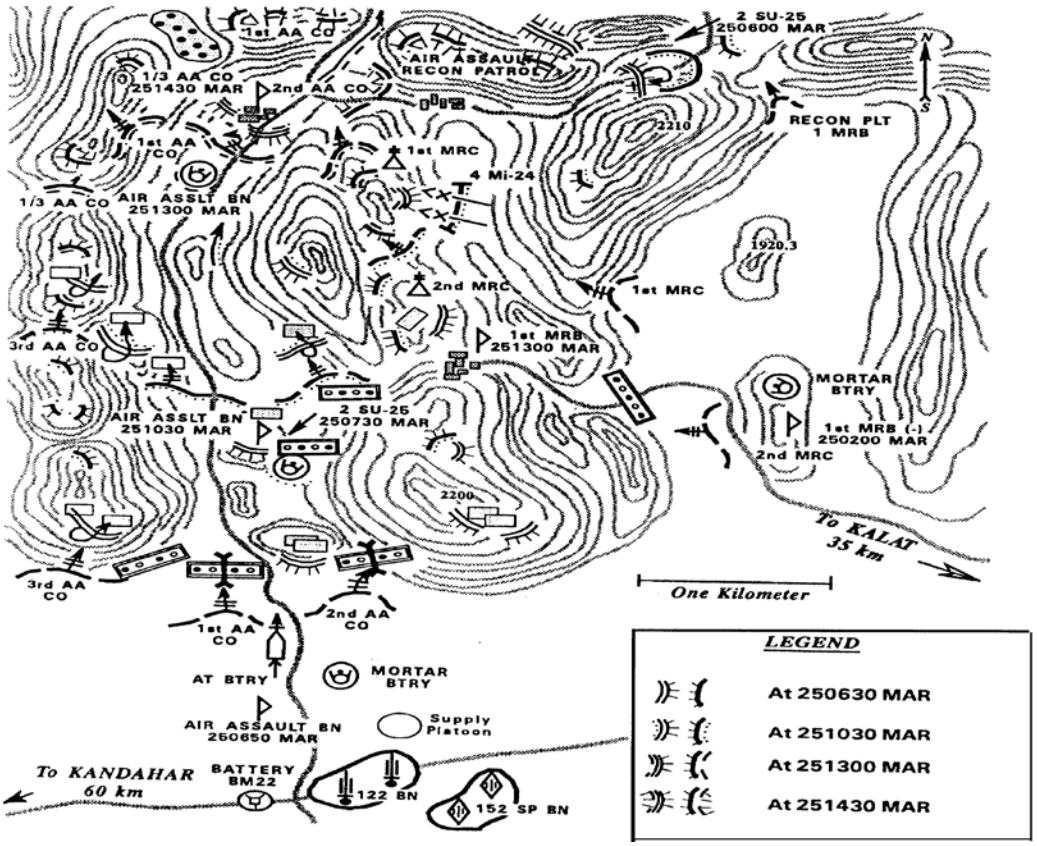


Figure 11 - A BM-27 multiple rocket launcher.

Therefore, cannon fired submunitions require a more sophisticated technological design, greater component hardening during the production process, a higher quality control process, and are generally more expensive than those delivered by missiles. These differences all support the development and use of multiple rocket launchers to emplace minefields and explains the growth or proliferation of MRLS delivered scatterable mines on the world's arms market.

The BM-22 MRLS has sixteen 220mm tubes which can fire a PTM or PFM minefield to a depth of 8 to 35 kilometers. The minefield laid by a single salvo from a single BM-22 can cover from 24 to 81 hectares.[17] Since this minefield spread has a low mine density, several salvos by several BM-22 MRLS will normally be fired to lay these tactical minefields directly on the intended target. A battery of BM-22s can easily lay a minefield covering several grid squares. The Russians feel that it is better to trap a force inside a minefield rather than merely creating an obstacle that the enemy can bypass.[18]

During their war in Afghanistan, the Soviets reportedly used vast quantities of scatterable mines to interdict guerrilla lines of communication and resupply. Further, the Soviets used scatterable mines to block the escape routes of retreating guerrilla forces. Map 1 shows a sweep by the air assault battalion and the 1st Motorized Rifle Battalion of the 70th Separate Motorized Rifle Brigade in a 1986 block and sweep action against a guerrilla force in a mountain canyon.[19] The force secures the canyon heights and pushes up the canyon floor. The BM-22 battery lays a remotely-delivered minefield to the north to catch retreating guerrillas.



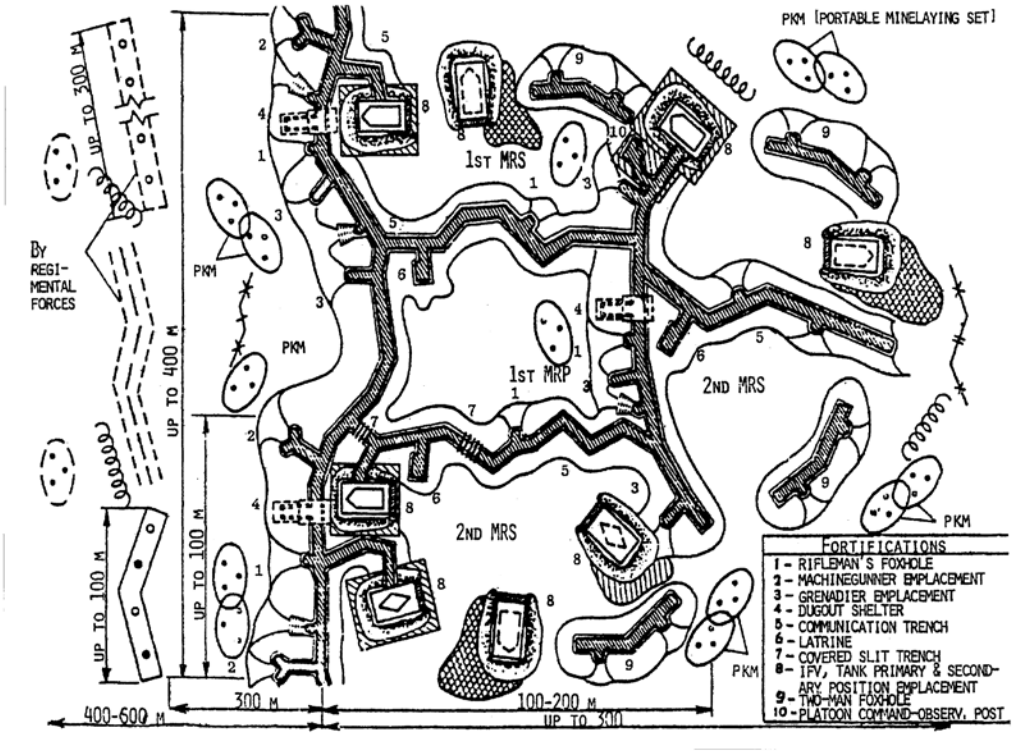
Map 1

Scatterable Mines Fired by Man-Portable Systems

The Russians have invented a man-portable scatterable mine dispenser. The PKM (perenosnogo komplekta minirovaniya or portable mine system) weighs 2.63 kilograms (5.8 pounds) without

the mine canister and consists of a single launch tube with a base mount, a blasting machine and a reel of electric ignition wire. The operator loads a propelling charge and mine canister into the launch tube, mounts the tube on the edge of a trench or firing parapet, aims the tube, connects the wire to the tube, moves off a safe distance and connects the wire to the blasting machine and then cranks the blasting machine. The PKM propels the canister some 30-100 meters (depending on the type of mine) and lays an antipersonnel mine field of 10X20, 10X40 or 20X10 meters (again, depending on the type of mine used). It takes a trained operator five minutes to set up the PKM and create a minefield.[20] The POM-1S mine canister most likely produces the 10X20 meter field while the POM-2s mine canister most likely produces the 10X40 meter field. The PFM-S mine canister most likely produces the 20X10 meter field. The PKM can also be used to launch the PTM-1S and PTM-3 antitank mine canisters.

Like the UMZ, the Russians use the PKM to lay minefields to protect subunit positions, flanks and the boundaries between subunits. PKM-laid minefields also cover firing lines and gaps in combat formations. The PKM can quickly close breaches in existing minefields and increase the density of mines on armor avenues of approach.[21]



Map 2

In the late 1980s, the Soviet Army began issuing the PKM to its motorized rifle battalions. The original issue was three per battalion.[22] Map 2 shows a motorized rifle platoon strongpoint which incorporates PKM-laid minefields in its defense.[23] Regimental assets and defending soldiers have emplaced minefields, wire obstacles and an antitank ditch to the west of the position. The regiment's UMZ detachment has also laid two remotely-delivered minefields to the west of the

position. In addition, the Russians have reinforced the platoon strong point with thirteen PKM-laid minefields both outside and inside the platoon strong point.

Conclusions

Remotely-delivered mines are increasingly popular and are well represented in the arsenal of many nations. This is because they offer quick response and flexibility to the combined arms commander and are ideally suited to the highly mobile, lethal battlefield of modern and future warfare. Systems developed by the Russians allow the delivery of scatterable mines from jet aircraft, helicopters, multiple rocket launchers, trucks and ground vehicles, or by dismounted soldiers in the forward parapet of fighting positions. The Russians are showing and selling these systems around the world as well as discussing their effective employment in open literature. Although this article has focused primarily upon former Soviet or Russian equipment, many other countries have valued the Russian approach or experiences and are producing similar scatterable mine systems of their own. These too, are being sold on the world arms market and are showing up in foreign militaries in increasing numbers. The U.S. military professional will eventually encounter these Russian systems either when contending with a force which has bought these systems, or when working with the Russian Armed Forces in future multi-national military operations.

Endnotes

1. Boris V. Gromov, *Ogranichennyy kontingent* [Limited contingent], Moscow: Progress Publishers, 1994, 312.BACK

2. E. S. Kolibernov, V. I. Kornev and A. A. Soskov, *Inzhenernoe obespechenie boya* [Engineer support of combat], Moscow: Voyenizdat, 1984, 106 states that a one-kilometer antipersonnel minefield requires 2,000-3,000 PMN or PMD-6M mines and 100-300 OZM-4 or POMZ-2m mines. Soviet minefields in Afghanistan were long and redundant. A kilometer minefield was a very small one-particularly since multiple rows of minefields surrounded most Soviet installations and outposts.BACK

3. HQ Department of the Army, *FM 5-71-100 Division Engineer Combat Operations*, Washington, D. C. , 22 April 1993, 13.BACK

4. V. Belikov, "Sredstva distantsionnogo minirovaniya" [Remote mine-laying systems], *Voyennyye znaniya* [Military knowledge], August 1993, 21.BACK

5. National Ground Intelligence Center, *Mines of the World*, interactive CD-ROM produced under the EOD/LIC program by ESSEX Corporation, July 1995.BACK

6. *Ibid.*BACK

7. *Ibid.*BACK

8. *Ibid.*BACK

9. Sales brochure in English from Erokha Scientific-Research Engineering Institute.BACK

10. Author's interview with Russian graduate of Frunze Academy. The system is not fully deployed throughout the Russian Army due to lack of funds. The UMZ are deployed in addition to the three TO&E PMR-3 mine laying trailers or GMZ armored tracked minelaying vehicles.BACK

11. Belikov.BACK

12. *Ibid.*BACK

13. A. Sukhobetskiy, "V usloviyakh minnoy opasnosti" [In conditions of danger from mines], *Tyl vooruzhennykh sili* [The rear of the armed forces], August 1989, 26.BACK

14. Belikov.BACK

15. *Ibid.*BACK

16. Sales brochure.BACK

17. A hectare is 2.471 acres.BACK

18. Belikov. The article is confusing here as it specifies a MRLS system with 16 tubes mounted on a Ural 375 truck. The BM-21 has forty 122mm tubes mounted on a Ural 375 truck. The BM-22 has 16 tubes, but is mounted on a ZIL 135 truck. Since the Soviets used the BM-22 extensively for remote mining in Afghanistan, I concluded that the author is referring to the BM-22.BACK

19. Frunze Academy History of the Military Art Cadre, *Boevye deystviya Sovetskikh voysk v Respublike Afghanistan* [Combat actions of Soviet Force in the Republic of Afghanistan], Moscow: Frunze Academy Press, 1991, 40.BACK

20. Belikov.BACK

21. *Ibid.*BACK

22. Author's May 1994 conversation with a Russian officer who had commanded a regiment.BACK

23. N. K. Shishkin et al., *Taktika (vzvod, otdelenie, tank)* [Tactics (platoon, squad and tank)], Part I, Moscow: Voyenizdat, 1992, 204.BACK