Issue Brief

CLAWS

Rethinking Our Mine Warfare Policy

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Historical background

Landmines have extensively been used in warfare as artificial obstacles for area denial and for creation of tactical barriers, where they serve to deter direct attack from or over a defined and marked area. The first recorded use of explosive landmines was by the Chinese Song Dynasty against an assault of the Mongols, who were besieging a city in Southern China in 1277 AD. In more recent times, the first war where mines played a relevant role was the Russo-Japanese War of 1904-05. Even though the Japanese Army succeeded in winning the war, their losses were very heavy; the Russian Army defended its positions at Port Arthur and Mukden with trenches protected by barbed wires, machine guns, rifled and repeating small arms; in particular, the trenches were defended by minefields with electric ignition. All these defences resulted in 50,000 Japanese casualties at Port Arthur and 70,000 during the ten battle days at Mukden. These defensive tactics in trench warfare were repeated in the First World War. In six weeks (August-September 1914) the attacks conducted by the French Army produced 385,000 casualties (100,000 dead). Subsequently, the 1914-18 conflict became an exhausting war of attrition with supremacy of the defensive over the offence guaranteed by the change in war fighting doctrine.

During the Second World War, two important developments took place in landmine warfare; the first one was the development of the anti-tank mine and the second was the introduction of anti-personnel mines (APMs), usually employed against infantry and to protect anti tank mines from mine detection and removal. After the Second World War, the main evolutionary trend has been one of miniaturisation and of substitution of metallic parts with plastic. In the Indian context, landmines were extensively used in the 1965 and 1971 Indo-Pak conflicts. Later, minefields were extensively laid during Operation Parakram which began in December 2001 and continued for a period of eleven months in anticipation of hostilities breaking out.

Mines and Mine Warfare

The main characteristic of a mine is that it is designed to be victim-actuated, which means it will detonate or explode through the 'presence, proximity or contact' of its victim (a person or a vehicle) with it or its fusing mechanism. The fuse may incorporate a tripwire, an anti-handling device or some form of electronic sensor. This is the main distinction between a mine and a classical munition. Some munitions

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are fused to act as mines, and detonate if touched or moved, but most are fused to explode on impact.

Landmines are usually designed to attack either tanks or vehicles (anti-tank mines) or people (anti personnel mines). Anti-personnel mines (APMs) come in two types: blast mines, which are surface or sub-surface laid and explode when trodden on; and fragmentation mines, which are usually activated by tripwires, and on bursting, project fragments of metal over a wide area. A variant of the fragmentation mine is the "jumping" mine which, when set off by tripwire, is projected upwards by a small explosive charge to about stomach height before the main charge explodes. Newer types of mine can be activated by proximity rather than contact pressure but the principle of victim activation remains the same.

Mine warfare is a defensive concept, designed to impose caution on the enemy, delay and disrupt his movement and canalise him into a pre-designated killing area. If placed in a location where movement is confined such as at a ford or on a bridge approach, a few mines can create an obstacle; however, mines are more frequently employed to create obstacles by distributing them in quantity over a relatively large area. Since combat engineers with mine-clearing equipment can clear a path through a minefield relatively quickly, mines are usually considered effective only if covered by fire. Because of their destructive potential, they constitute a physical hazard to the enemy, resulting in injury or death to personnel and damage or destruction to equipment. By their very nature, landmines also constitute a psychological hazard to the enemy, wherein the fear of becoming a casualty may result in lowering the enemy's will to fight.

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Deterrent Validity

While landmine warfare may have had its uses in some of the earlier battles fought, and may still have a certain measure of relevance today, we need to examine the utility of laying mines over vast swathes of areas in the context of the short-duration high intensity wars we are likely to fight in an environment of great battlefield transparency. Though landmines are portable and relatively easy to lay, large scale employment requires considerable time, manpower, and logistical effort. The issues that thus come up for consideration are: -

- Do we need to lay minefields across hundreds of kilometers of real estate on our Western Border?
- Does the threat perception justify such an effort?
- What is the efficacy of laying mines in the mountains?
- Are mines the only means available to achieve some sort of deterrence or can the same or greater value be achieved by other more efficient methods?
- In a short duration war, where the warning period is minimal, is the effort expended on laying mines proportionate to the gains likely to be achieved?

In the context of modern short-duration intense wars, these issues need a de novo reevaluation.

Utility of Mine Warfare

It is a fact that conventional mine warfare is rarely "played" seriously in training exercises and war games. Also, the battlefield threat that friendly APMs represent to one's own troops is often intentionally

minimised. A review of the military value of APMs suggests that their limited utility is far outweighed by their human cost.

History has shown that mines can only act as delaying elements, and have never yet stopped a determined advancing enemy. With increasingly effective breaching equipment, as was used in the war over Kuwait, the delaying value of minefields has been considerably reduced. In the India-Pakistan wars of 1947-48, 1965 and 1971, the contribution of these minefields to the ultimate outcome of the conflict was considered to be marginal. In the Sino-Indian conflict of 1962, no pre-planned minefields were laid at the start of the war but as the conflict progressed, some were laid in mountainous areas. This caused major problems as APMs had no effect in snow and, worse still, they slid down the slopes, even if they were anchored, because of snow movement and precipitation. Mapping was extremely difficult and was ineffective.

Extensive laying of minefields does not merit the time, effort and resources involved to achieve the degree of protection afforded from an enemy attack. Although the Iraqi Army laid an estimated 9 million mines in Kuwait, few, if any, reported Coalition casualties were due to mines. British General Sir Hugh Beach testified to the House of Commons in 1995: "*Where regular military use is concerned, there is no case known where APMs as such have influenced a campaign, a battle or even a skirmish in any decisive way*." Former US Marine Corps Commandant Alfred Gray made the point even more strongly: "*I know of no situation in the Korean War, nor in the five years I served in Southeast Asia, nor in Panama, nor Desert Shield-Desert Storm, where our use of mine warfare truly channelized the enemy and brought him into a destructive pattern. I'm not aware of any operational advantage from [the] broad deployment of mines*."

Mines cause a large number of casualties to own

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troops during mine laying operations as well as during demining operations on cessation of hostilities. As an example, the mines laid by the Indian Army in Operation Parakram and their subsequent removal led to a colossal number of casualties in a war that was never fought. As per the statement of the then Defence Minister, Mr. George Fernandes in the Lok Sabha, "up to July 2003, a total number of 798 Army personnel suffered fatal casualties during Operation Parakram." In the initial phase of Operation Parakram itself, around 100 soldiers were killed and 250 injured during mine-laying operations. While some casualties were caused due to vehicle accidents and enemy shelling, a majority occurred during demining operations as removal of land mines is dangerous, slow and costly. For a country to suffer such heavy casualties without even going to war is shocking. In comparison, 527 Indian soldiers lost their lives while heroically taking back heights occupied by Pakistanis in the Kargil conflict in 1999.

Anti-Personnel Mines (APMs)

The stopping potential of APMs is low. Casualties caused due to such mines are negligible and are an inadequate deterrent to assaulting infantry. Infantry assaults are broken not by minefields but by the coordinated use of direct and indirect firing weapons. Even if the defender lays anti-personnel minefields at a density of one (one mine per yard of front covered), the casualties caused to infantry assaulting troops will be a lowly two to

three percent. Anti-personnel minefields have thus never prevented an attacker from assaulting an objective despite the fact that APMs constitute a psychological hazard. On the contrary, they impose restrictions on the defending force as the defender is conscious of the fact that the area concerned is mined and tends to avoid the same. Military doctrine on their use does not appear to have learnt many lessons from the past. In conflict after conflict, own minefields have impeded the movement of friendly forces and resulted in fratricidal accidents. In many instances, patrols were frightened of using the "safe lanes" through minefields and patrolled up to the minefield edge and no further, thus reducing rather than enhancing the security of the position. Yet we continue to lay them.

The lack of proper maintenance and surveillance has rendered many minefields useless, whether they were created for border control, the protection of bases or the protection of certain infrastructure installations. In addition, certain terrains are particularly unsuitable for minefields because the mines can move considerable distances and therefore do not create the intended obstacle, for example in areas of shifting sands or steep terrain. It has been claimed that the APM is still necessary in armoured combat to stop sappers dismounting during an armoured advance and clearing anti-tank mines by hand, but this does not seem to be a likely contingency in armoured warfare.

Laying of anti tank minefields should be more selective to cover areas of greater vulnerability and likely approaches rather than an extended line over the entire length of the border.

In the India specific context, when mines are laid all across the Western front, we are looking at an aggregate frontage of something like 2000 kms of minefields. At density of ½, the quantum of APMs to be laid is a staggering one million mines. Such an effort is unjustifiable, considering the nature of threat faced from Pakistan. It involves the procurement, holding and subsequent laying of such mines in a short time frame to achieve what can at best be described as a nebulous result.

APMs are also widely considered to be unethical weapons when used in the area-denial role, because their victims are commonly civilians, who are often killed or maimed long after a war has ended. In Cambodia, area-denial mines have resulted in 35,000 amputees after the cessation of hostilities. In India too, a large number of civilians have lost life and limb due to mines which have not been recovered from their fields in the earlier conflicts of 1965 and 1971 as also in mines laid thereafter. While minefields are marked with warning signs and cloth tape, to prevent friendly troops and non-combatants from entering them, accidents still occur at regular frequencies. Even though minefields are properly marked to account for all the mines laid, their post-hostility removal is always a high-risk operation and many mines are eventually never recovered. In addition, APMs are also long-lasting. Mines laid in Libya and Europe during World War II are still active and causing casualties over 60 years later. Modern plastic-cased mines, which are stable and waterproof, are likely to remain a hazard for many decades.

Considering the above, there is a need to do away with the conventional anti-personnel mine (NMM 14) being used in the army. To provide close protection to troops, fragmentation mines such as the Claymore are more useful, both in terms of protection afforded as well as ease of laying, arming and subsequent recovery. These mines need not be armed till hostilities actually break out; the risk of mine casualties to own

troops thus gets mitigated to a large extent, without compromising on the quality of the defence. In the hills, especially in the higher altitudes of our Eastern border, unconventional means of denying approaches to the enemy could also be considered. One such method is the deliberate planting of rhododendrons to cover specific approaches. Their utility can be gauged from the fact that well-trained infantry *ghatak* platoons cannot penetrate through areas with a heavy cover of rhododendron bushes even by day. The difficulties of negotiating such an obstacle by night will be compounded many times over. Besides the obvious military advantages, this would also have a positive ecological impact. We hence need to think out different area specific methods for protecting our borders rather than depend solely on conventional ordnance.

Anti-Tank Mines

Anti tank mines are relatively safer to lay and recover. They also have much greater utility as they cause prohibitive damage to enemy assaulting armour. While tanks can use ploughs to negotiate anti-tank minefields, there will always be a time penalty involved. If an operational track has to be constructed through the minefield, then it would also be necessary to clear a safe lane further accentuating delay. So the importance of anti-tank minefields cannot be diluted. However, we need to question the current policy of laying such minefields to cover each and every conceivable approach.

While enemy mobile forces have the capability to strike anywhere across the international border, the number of thrust lines which they can execute is limited. For the Indian defensive formations to cover hundreds of miles of real estate with anti-tank minefields as a counter to the limited strike capability of the enemy forces speaks of a defensive mindset which is more conducive to achieving stalemate in battle rather than outright victory. Here too, because a large area has been covered by anti tank mines, the same is not available for use by own mobile forces. Operations thus get restricted and require great coordination to enable own mobile forces to negotiate friendly artificial obstacles.

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New Mine Technologies and their Implications

The development of the remotely delivered mine (RDM) has radically altered the nature of mine warfare. In a fluid manoeuvre battle, mines can be deployed by artillery or rocket anywhere the enemy threatens to advance or to outflank. Obstacle belts can be created in response to enemy actions, and mines can be used extensively to neutralise other weapons, such as mobile artillery. While RDMs may have the potential to revolutionise the battlefields of the future, it is still doubtful whether they will be able to generate a significant military advantage. For RDMs to be effectively employed, the precise location of enemy forces must be known. But if the precise location of enemy forces is known, one could probably achieve more kills with conventional artillery or air support. Thus the better the intelligence, the less the need for remotely delivered mines; and the worse the intelligence, the more their use will tend to

be widespread or indiscriminate as commanders will be tempted to put more minefields down to cover all contingencies; a typical catch-22 situation.

Self-neutralisation or self-destruction mechanisms have been incorporated in the fuses of some mines since the 1970s, and these features are held by some to be a viable alternative to mapping and fencing minefields. The problem is that fuses of this type have not yet demonstrated sufficient reliability under battlefield conditions. Technology of self destructing devices is however not difficult to achieve, since a battery can be a simple way to control the mine life. The problem of costs is however open and might be a relevant obstacle to the spreading of this new standard.

The use of the mine on the battlefield has led to the development by the military of many types of mine-removal systems, which in turn have prompted the development of countermeasures to those removal systems. In "conventional" mechanised warfare, nations have devised a whole range of mine-clearance equipment, such as flails, ploughs and explosive devices, to actuate the mines ahead of the advancing forces or to remove them. This has led to the development of mine fuses that destroy the clearance ploughs mounted on the front of tanks, and fuses that are specifically resistant to the short, high-pressure pulse of explosive hose or gas explosion.

Future minefields may be designed as intelligent entities and landmines endowed with sensors might be used to extend the territorial control. For example, acoustic sensors could discriminate between wheeled and tracked vehicles, small or large to activate an infrared detection system that will indicate the approaching direction of the vehicle in a range of up to 100 m. Warheads can then be programmed to fight with the maximum effect. As always, the cost benefit ratio has to be considered.

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Recommendations

The use of APMs as indispensable weapons of high military value is questionable. We may hence consider doing away with AP minefields altogether and use only munitions of the type of M18A1 Claymore AP munitions for close protection of defensive localities. Such munitions have greater stopping power, are easily emplaced, and are equally easy to remove when no longer tactically relevant.

Establishing, monitoring and maintaining extensive border minefields is time-consuming, expensive and dangerous. In order to have any efficacy at all they need to be under continuous observation and direct fire, which is not always possible. Moreover, these minefields have not proved successful in preventing infiltration. We need to be more selective in our minefield planning which must be based on a realistic threat assessment. The tendencies of commanders to cover each and every conceivable threat are indicative of a lack of confidence and smacks of poor leadership.

Barbed-wire entanglements, if used properly and covered by aimed fire, can exert an equivalent delaying effect on enemy troops, although they are slow and labour-intensive to deploy and maintain. Protective fences, often in combination with sensors, are also suitable alternatives. Use could also be made of unconventional means in area denial such as planting of rhododendrons in high altitude areas. These are however long term measures and need to be well thought out and executed over a period of time. However, good intelligence, normal vigilance and

tactical flexibility are viable alternatives to the use of APMs, and can make static defence systems such as the AP minefields decreasingly relevant.

Increased use of remote surveillance methods such as electronic sensing devices, real-time satellite intelligence and drone aircraft with infrared and photographic capabilities could substitute for mine use. The early-warning capabilities of such devices could offer military advantages similar to the delaying effect of minefields. Upon detection, advancing forces could be targeted with ordnance other than mines, delivered by artillery, aircraft or direct fire. Currently available equipment such as trip flares and night vision equipment could also serve an early warning purpose similar to that of mines in detecting attempts at breaching or infiltration.

Conclusion

Troops in defended localities need early warning to facilitate the engagement and destruction of the enemy. The key to the defensive battle hence continues to be surveillance over the battlefield and the coordinated application of all available fire power, to disrupt, delay and finally defeat the enemy before he can reach the line of defences. While anti-tank minefields have some utility in this context, especially in terms of preventing an assault by enemy armour and in separating the tanks from the infantry, blast-type APMs serve no useful purpose. In the current battlefield scenario, it would be difficult for the defensive troops to be surprised by an attacking enemy, considering the plethora of observation devices that are available resulting in the battlefield becoming relatively transparent. Minefields appear to be more of a psychological prop to the defender rather than a deterrent to the enemy, which in itself is a dangerous trend as troops would tend to disregard heavily mined areas as no go areas and to that extent would be less prepared to defend them. We need to be more selective in laying of minefields, restricting the same to areas of great vulnerability or sensitivity which could be covered with a mix of anti-tank and Claymore mines. Other defended localities need have only Claymore mines for close protection.

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We also need to consider holding a small quantity of RDMs at the divisional level to cater for unforeseen eventualities in a conflict situation. This would do away with the requirement of having defensive minefields as RDMs would be a viable substitute.

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