

INVENTIVE ORDNANCE

MINE WARFARE

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"Mine" is a term that in old military terminology meant the underground passage or "gallery" dug by the besiegers of a town or fortress either to make a surprise entry or to blow up the defense works on the surface by means of an explosive charge. The "mines" widely used beginning in the 15th century were countered by the defenders with "countermines", sometimes prepared during the construction of the surface defense works.

On the battlefield, the term is now used for a variety of explosive devices, underwater (naval mines) or on land (land mines), generally comprised of a powerful charge contained in a case fitted with an impact, pressure, magnetic, acoustic, or thermal fuse. Mines were used very widely during the Second World War (on Earth, mid-20th century), both to block roads and to deny extensive areas to the enemy. Land mines can be broadly divided into anti-personnel and anti-tank/vehicle mines, according to use. Naval mines can be divided into anti-ship and anti-submarine, depending on use and placement.

In this article, we will present a broad spectrum of mines, methods and means to emplace them, and examples in their use. Each type of mine will be given a designation according to its target and its use.

METHODS OF DETONATION:

CONTACT (C)- Detonated by direct contact such as stepping on, running over with a vehicle, etc.

PRESSURE (P)- Detonated by a change in pressure, or it can be set for a certain pressure which will set it off (Naval), or by a certain amount of pressure being put on the detonator, such as 500 lbs (Land).

MAGNETIC (M)- Detonated by a change in the magnetic field in the area around the mine when a large amount of metal (armored tank, vehicle, or naval vessel) passes over or by the mine.

CAPACITANCE (CP)- A more sensitive type of magnetic detonator which is detonated by the inherent magnetic field that surrounds most objects including (and especially) personnel.

ACOUSTIC (A)- Detonated by a sharp or loud sound, the strength of the noise needed depends on what the threshold of the detonator is. Used primarily for naval mines, however another type is based on geosound detection which detect the vibrations caused by personnel moving, tanks' treads or equipment moving.

RADAR (R)- Detonated by an object (personnel or vehicle) breaking a radar beam. Requires an active radar system which can be detected by special equipment.

THERMAL (T)- Detonated by either a rise in temperature caused by a vehicle engine passing by or the infra-red signature given off by an individual soldier passing by the sensor.

TRIP-WIRE (TW)- Detonated by added or released pressure on a wire usually stretched across an area of travel. By overlapping the wires, one can create a maze of wires where one mistake can mean disaster. Mostly used for anti-personnel mines.

LIGHT or INFRA-RED BEAM (LB or IRB)- Detonated by breaking a light or infra-red beam and causing the photocell on the receiving end to close a circuit.

COMMAND DETONATED (CD)- Detonated by a signal transmitted either by wire or by radio. This gives the individual controlling the mines the opportunity to time the mine's detonation to

cause the most damage.

GRAVITIC (G)- Detonated by a change in the gravity field caused by anti-gravity generators used on anti-grav vehicles.

ANTI-PERSONNEL:

MAP- Mine, Anti-Personnel. This is a simple high-explosive charge which is set off by being stepped on, rolled over in a vehicle, etc. One of the simplest types of mines and the easiest and cheapest to construct. Types of detonators: C, P, A, R, T, CP, LB, IRB, TW, or CD.

MAPF- Mine, Anti-Personnel, Fragmentation. Differs from MAP only in that the charge is encased in a shell that on detonation fragments and these fragments shoot out in all directions causing damage. Types of detonators: C, P, A, R, T, CP, LB, IRB, TW, or CD.

MAPSCF- Mine, Anti-Personnel, Shaped-Charge, Fragmentation. This mine has a shaped-charge, which directs the blast in one direction, thereby increasing the damage caused. Normally, the blast affects an area 30-45 degrees to either side of the direction the charge is pointed, creating a 60-90 degree area of effect. (A good example of this mine is the U.S. Claymore.) Types of detonators: C, P, A, R, T, CP, TW, LB, IRB, or CD.

MAPLF- Mine, Anti-Personnel, Launched Fragmentation. When this mine is triggered, the charge is catapulted upward, usually by a smaller secondary charge, where it explodes. By being above the ground when it goes off, this charge has a larger blast radius and area of effect. (A good example is the U.S. "Bouncing Betty".) Types of Detonators: C, P, A, R, CP, TW, LB, IRB, or CD.

MAPG- Mine, Anti-Personnel, Gas. When detonated, a poisonous gas (different types) is released. The gas can be fatal, knock-out, or incapacitating. Types of detonators: C, P, A, R, CP, TW, LB, IRB, or CD.

MAPI- Mine, Anti-Personnel, Incendiary. This mine serves two functions: one is to injure/incapacitate personnel in the area of the mine, and, to signal that there are personnel in that area as the incendiary charge creates light and smoke, which can be seen for a great distance in day or night. Types of detonators: C, P, A, R, CP, TW, LB, IRB, or CD.

ANTI-TANK/VEHICLE:

MAV- Mine, Anti-Vehicle(Tank). This mine differs from the MAP only in that the charge of high explosive is larger and more powerful. Most times it is used in conjunction with an ambush to immobilize a tank or vehicle so that the ambushers can get to it. Types of detonators: C, P, M, A, CD.

MAVSC- Mine, Anti-Vehicle(Tank), Shaped Charge. High explosive charge shaped so that it explodes directly along an axis

(usually upward) thereby increasing the force of the explosion and doing more damage. Types of Detonators: C, P, M, A, CD.

MAVI- Mine, Anti-Vehicle(Tank), Incendiary. This mine, like the MAPI, serves two signal as well as cause damage. The incendiary charge is usually larger in this mine compared to the MAPI so that it is capable of damaging a vehicle/tank. Types of detonators: C, P, M, A, CD.

MAVP- Mine, Anti-Vehicle(Tank), Projectile. When this mine is detonated, a projectile or missile is launched. This projectile can be a missile, a rocket, or a simple explosive round of some kind. The usual type of use is for the MAVP to be set up pointing across a trail or road, with the detonator on the route of travel. When a vehicle/tank trips the detonator while moving down the trail or road, the projectile is launched. Usually a high-explosive anti-tank rocket or a high-velocity cannon is used for this mine. Types of detonators: C, P, M, A, CD.

ANTI-NAVAL VESSEL:

MAV(N)- Mine, Anti-Vessel (Naval). Normally these mines are either moored in place or in shallow waters, placed on the bottom of the body of water. In some cases, however, the mines have been set adrift to make an area hazardous to shipping. Types of detonators: C, M, A, or CD.

ANTI-SUBMARINE:

MAS- Mine, Anti-Submarine. The only real difference between this mine and an anti-vessel mine is in placement and type of detonator used. Where an anti-vessel mine would be moored in place and chained so that it floated close to the surface, an anti-submarine mine could be placed at any depth and several would be placed at different depths so as to leave no way for a submarine to get past them without activating one of them. Types of detonators: C, M, or A.

ANTI-GRAVITY MINES:

MAG- Mine, Anti-gravity. These mines are an unusual design in that they allow their users to deny, not only ground travel, but air travel as well. These mines float on anti-grav units at prearranged heights making it difficult for aircraft of any type to get by them without setting them off. Types of detonators: C, M, CP, R, T, or CD.

MAGF- Mine, Anti-Gravity, Fragmentation. Same as a MAG, but has a fragmentation charge instead of high explosive. Types of detonators: C, M, CP, R, T, or CD.

MAGI- Mine, Anti-Gravity, Incendiary. Used primarily as a signaling device but is often used to incapacitate personnel and/or vehicles. Types of detonators: C, M, CP, R, T, or CD.

MAGP- Mine, Anti-Gravity, Projectile. When detonated, this mine launches several sub-munitions (small bombs or missiles) which then either fall and explode in a wide area (bomblets) or precede to try to find a target that meets their tracking needs, such as a heat source for an infra-red homing missile (missile). Types of detonators: C, M, CP, R, T, or CD.

MAGG- Mine, Anti-Gravity, Gas. Similar to other gas mines with same detonators and effects.

METHODS OF DISPERSAL:

MINELAYING BY HAND: This is when a unit of infantry or other troops (usually combat engineers) move into an area and emplace the mines. All trip-wire detonated mines have to be set up this way. Emplacing a mine involves digging the hole (if the mine is

buried), laying the mine (for MAPSCF, this usually means setting the mine up facing the direction the blast is wanted to go), setting the detonator (for pressure or acoustic geo-sound, this is setting the threshold; for trip-wire, this is running the wires and connecting them to the mine) and covering and camouflaging the mine.

MINELAYING BY LAND VEHICLE: Several vehicles have been specially designed to lay mines. The usual process is the vehicle enters the area to be mined and then starts laying mines. Some vehicles use trench digging equipment which is part of the vehicle. Into this trench, at intervals, the mines are placed. Then, another piece of equipment on the vehicle covers the mines. Other vehicles lay out the mines on the surface already armed.

MINELAYING BY AIRCRAFT/HELICOPTERS/HOVERCRAFT: Several systems have been designed to lay mines from aircraft/helicopters/hovercraft. One system, which is used on aircraft/helicopters uses a dispersal container which jettisons the mines in a set pattern at set intervals. Small drogue parachutes or the shape of the mine, make sure the mine lands correctly. This is mostly used to lay anti-tank/vehicle mines or naval mines. Another system, used by hovercraft, has a launcher which is similar to depth-charge projectors used during WWII. This system is mounted on the rear of the hovercraft, from which it fires mines behind and to either side of the hovercraft. A small parachute makes sure the mines land effectively.

MINELAYING BY ARTILLERY: A special artillery shell has been constructed which carries from 12 to 36 mines (depending on the caliber of the artillery and the size/type of mine). This shell, when fired, travels until it starts to fall toward the area of impact. A small explosive then explodes causing the outer casing of the shell to fall away. The mines then descend using parachutes to the surface. These mines are usually radio activated (in other words, they are turned on using a preset frequency, which when broadcast activates/arms the mine.).

BattleTech: Long Tom shell- Carries 48 MAP, MAPF, or MAV; 24 MAVSC, MAVI, or MAPI.

MINELAYING FROM SPACE: It is possible to mine an area on the surface of a planet from space. A reentry vehicle, carrying 10 to 100 mines, enters the atmosphere. Upon reaching a preset altitude, the vehicle starts releasing mines, which fall to the surface using parachutes. Depending on the dispersal rate used, the area mined in this fashion can be as small as a couple of square miles to an area of 50 square miles. Understand, however, that if you did try to mine an area of 50 square miles with one reentry vehicle that the number of mines per square area would be so low as to make the mining attempt practically useless.

MINELAYING BY OTHER MEANS: For BattleTech: Special packages can be designed to be carried by 'Mechs which launches the mines as the 'Mech moves through the area. Also, there have been reports of combat engineer 'Mechs designed specifically to lay mines. For Star Trek Role-Playing Game: Certain shuttles can be equipped with a mine laying/launching/dispersal system which jettisons the mines as the shuttle moves through the area. For Traveller: Grav-rafts can be equipped to lay mines using the same system that is mentioned for hovercraft.

	M A P F	M A P F	M A P S C F	M A P L F	M A P G	M A P I	M A V S C	M A V I	M A V P
BattleTech:									
Area of effect (in hexes)	[2]	[2]	[2]	[2]	[2]	[2]	1	1	1
Damage/Veh	ND	ND	ND	ND	ND[7]	[10]	8[1]	10[1]	5[3]
Damage/Pers	1*	1*	2*	2*	3[5]	2*	3*	2*	3*
MechWarrior:									
Area of effect (in hexes)	1	2 rad	3 arc	2 rad	2 rad	3 rad	3 rad	2 rad	3 rad
Damage/Veh	[9]	[9]	[9]	ND	[7]	[10]	8[1]	10[1]	5[3]
Damage/Pers	4D+2[8]	3D+2[8]	5D[8]	3D+2[8]	3[5]	2D[8]	6D[8]	7D[8]	4D[8]
Top Secret:									
Area of effect (full dam/hlf dam)	5'/6-10'	8'/9-15'	5'/6-16'	10'/11-20'	5'/6-10'	10'/11-20'	20'/21-40'	10'/11-20'	15'/16-30'
Damage/Veh	[9]	[9]	[9]	ND	[7]	[11]	1(+3)[12]	2(+3)[12]	[11]
Damage/Pers	1D4/1D6	1D6/1D8	2D4/1D8	1D6/1D8	3[5]	[11]	1D6/1D8	1D6/2D6	[11]
Star Trek RPG:									
Area of effect (in squares)	2 rad	4 rad	10 arc	6 rad	6 rad	6 rad	6 rad	4 rad	6 rad
Damage/Veh	ND	ND	ND	ND	[7]	3D10+3	6D10+6	7D10+7	4d10+5
Damage/Pers	[14]4D10	4D10+20	4D10+20	4D10+20	[15]	3D10+3	6D10+6	7D10+7	4D10+5
Traveller									
Area of effect (in squares)	2 rad	4 rad	10 arc	6 rad	6 rad	6 rad	6 rad	4 rad	6 rad
Damage/Veh	[17]	[18]	[19]	[20]	[7]	[11]	[21]	[22]	[11]
Damage/Pers	[17]	[18]	[19]	[20]	3[5]	[11]	[21]	[22]	[11]

M A V(N)	M A S	M A G	M A G F	M A G P	M A G G
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BattleTech:						
Area of effect (in hexes)	1	1	N/A	N/A	N/A	N/A
Damage/Veh	20	20	N/A	N/A	N/A	N/A
Damage/Pers	[23]	[23]	N/A	N/A	N/A	N/A
MechWarrior:						
Area of effect (in hexes)	5 rad	3 rad	N/A	N/A	N/A	N/A
Damage/Veh	20	20	N/A	N/A	N/A	N/A
Damage/Pers	[23]	[23]	N/A	N/A	N/A	N/A
Top Secret:						
Area of effect (full dam/hlf dam)	10'/11-20'	10'/11-20'	N/A	N/A	N/A	N/A
Damage/Veh	2(+3)[12]	2(+3)[12]	N/A	N/A	N/A	N/A
Damage/Pers	[23]	[23]	N/A	N/A	N/A	N/A
Star Trek RPG:						
Area of effect (in squares)	2 rad	4 rad	8 rad	8 rad	[13]	8 rad
Damage/Veh	6D10+6	6D10+6	ND	ND[7]	[13]	ND[7]
Damage/Pers	[14] [23]	[23]	4D10+20	3D10+10	[13]	[5]
Traveller						
Area of effect (in squares)	6 rad	6 rad	8 rad	8 rad	[16]	6 rad
Damage/Veh	[22]	[22]	ND	ND	[16]	NA[7]
Damage/Pers	[23]	[23]	[17]	[18]	[16]	[5]

Key:

* Number of dice to roll. Number rolled is how many men are lost out of the unit that detonated the mine.

ND - No damage is taken.

N/A - cannot be used in that particular game system.

[1] - Damage to vehicles is applied as per vibrabombs. Same for 'Mechs.

[2] - Roll 1D6 when a unit enters a standard mined hex. On a roll of 1 or 2, the unit has struck a mine (unless it is not possible for the unit to set off the mine, say an infantry unit cannot set off a magnetic mine set for vehicles.).

[3] - For 'Mechs, this type of mine raises the heat level of a 'Mech by 5 pts for the turn it is set off and the turn following. If the 'Mech does not leave the hex, his heat level will continue to be raised by 5 each turn cumulative. In other words, on the second turn, his heat level will be raised by 10, on the third turn it will be raised by 15 and so on. Also this type of mine when set off will start fires (roll as per flamers trying to start fires.).

[4] - Damage depends on the type of projectile launcher used. Standard practice is the use of a SRM-2 Inferno Launcher (for *BattleTech*), anti-tank grenade (for *Top Secret*, *Twilight 2000*, or *MegaTraveller*).

[5] - Damage depends on what type of gas that is used. The number is the number of D6 of personnel affected by the gas. Knockout will produce unconsciousness; Nerve gas will kill; CS gas will incapacitate. Remember that if the troops are in any type of closed environment suits gas will not affect them.

[6] - As per the weapon used.

[7] - If the vehicle is open (as in a hover transporter, groundcar, or hoversled), then the troops on board will be affected. Treat them as if they were not on the vehicle and roll for troops affected.

[8] - Personnel not in the hex of detonation take only half damage.

[9] - No affect unless vehicle is open (as in hover-transporter, hovercar, jeep, or open truck) in which case troops will take damage as if they were on foot.

[10] - Treat as Inferno round.

[11] - Treat as White Phosphorous round.

[12] - Number is number of times to roll 1D10 on crash table. The + modifier is applied to the roll before determining affect.

[13] - In ST:RPG the projectile weapon most often used is the equivalent of a phaser rifle set on disrupt or disintegrate.

[14] - Full damage is taken in the center square; half damage is taken out to the edge of the area of effect.

[15] - Same as in note 7 but all personnel in area of effect are effected.

[16] - Standard weapon for Traveller would be a Heavy Laser Rifle or a FGMP.

[17] - Treat as a 4 cm RAM grenade HE round for purposes of target characteristic DMs and doing 6D damage.

[18] - Treat as a 4 cm RAM grenade Flechette round for purposes of target characteristic DMs and doing 4D damage.

[19] - Treat as a 4 cm RAM grenade Flechette round for purposes of target characteristic DMs and doing 6D damage.

[20] - TDX is normally used, so treat as if a charge of TDX had gone off in the target square.

[21] - Treat as a 4 cm RAM grenade HE round for target characteristic DMs and damage.

[22] - Treat as a 4 cm RAM grenade HEAP round for target characteristic DMs and damage.

[23] - Personnel would not be immediately affected but would suffer the results of the damage on their vessel.

Tactics and Use of Mines:

Throughout history, and most likely into the future, mines have been used in several ways but most often they are used to deny an enemy the ability to use the particular piece of real estate for his purposes. An example: mining a road so that the enemy cannot travel on it.

Another tactic mines are useful for is to channel or drive your opponent into an area you want him to be in. An example would be mining areas to force your opponent to move into the firing arc of heavy artillery you have set up. Or mining areas so that he is forced into an ambush. This method gives him a choice of facing the ambushers or the minefield.

Naval mines, whether anti-vessel or anti-submarine, have most often been used to deny a route to the enemy by mining the sea routes. Anti-submarine mines have been planted in the openings of harbors to prevent submarines from entering these harbors and creating havoc with their torpedoes.

Whatever reason you mine an area for, remember, you can mix the types of mines you have in one field to confuse your opponent. A good mix would be an area of anti-tank mines, then an area of anti-personnel, then another area of anti-tank mines. Most combined forces groups send their infantry ahead to scout. The infantry would pass over the anti-tank mines and run afoul of the anti-personnel mines. They would then call up their armor counterparts to help them clear the mines. Upon approaching the anti-personnel mines, the armor would contact the anti-tank mines and things would be a real mess.

Also, you can mix different types of anti-personnel mines in one field and mix types of detonators. This will most likely have you dreaming of different mixes and set-ups with which to confuse your erstwhile opponents.

In another article we will show methods and means to defuse these fields of horror/mines. For now, good hunting.

