Landmine Monitor Report 2000 – Full Text

"AT mines are designed to immobilize or destroy vehicles and their occupants"

Department of the Army (1998), MINE/COUNTERMINE OPERATIONS,
Field Manual 20-32, Washington, DC, 29 May 1998.

Antipersonnel effects of antivehicle mines

INTRODUCTION

As is generally known, the Ottawa Convention tries to impose a total ban on anti-personnel (AP) mines, yet at the same time denies that anti-tank/anti-vehicle (AT/AV) mines and anti-handling devices are, or were, ever part of the problem. Not only do AT/AV-mines cause severe civilian suffering, due to their sensitive fuzes and anti-handling devices (AHD), they often function just like AP mines.

Under the *terms* of the Ottawa treaty, antivehicle mines equipped with anti-handling devices are **not** considered to be AP mines and therefore **not** prohibited.

But according to the Ottawa Treaty *definitions* antivehicle mines with antihandling devices that explode from an unintentional act or innocent act are considered antipersonnel mines and therefore prohibited. The *diplomatic history* from Oslo clearly shows that this was the intent and understanding of the negotiators. Yet, few governments since have publicly recognized this fact or taken appropriate steps to ban such mines (HRW, 2000: Fact Sheet prepared for the first meeting of the standing Committee of Experts on the general Status and operation of the convention, 10-11 January).

The amended CCW protocol 2 again prohibits at least the use of mines, booby-traps or other devices which employ a mechanism or device specifically designed to detonate the munition by the presence of commonly available mine detectors as a result of their magnetic or other non-contact influence during normal use in detection operations (Article 3.5.). Article 3.6. prohibits the use of a self-deactivating mine equipped with an anti-handling device that is designed in such a manner that the anti-handling device is capable of functioning after the mine has ceased to be capable of functioning. This covers AT/AV mine types equipped with (non electric) mechanical AHD devices which can be detonated by an unintentional act.

A lot of reports indicate that AT/AV mines represent a significant burden and danger to civilians in almost all mine affected nations and they are deliberately used against civilians, just like AP mines. AT/AV mines pose a considerable threat to the civilian population, and claim many victims. Especially since their explosive force makes their impacts all the more devastating, and usually fatal for several victims. Often AT/AV mines are laid together with AP mines to increase their destructive power yet further. Buildings, railway lines, roads and other infrastructures are often blocked with AT/AV mines. Due to the sensitive fuze technologies of AT/AV mines, which can also cause a mine explosion from an unintentional act, individual people are basically threatened by such mines when they move (either with or without a vehicle!) over/past/close to such mines.

The public available data regarding AT/AV mines increases the perception, that a lot of these mine types are suspected to violate both, the CCW 2 Protocol and Ottawa-Treaty. Therefore

international law must address these misfittings in order to overcome the worldwide landmine problem. In this sense all Ottawa and CCW-2 member states are urged to clarify the consistency of their antivehicle mines with these treaties and should be asked to report all existing AT/AV mine stockpiles to the UN General Secretary. Ottawa Member States should provide this information within their article 7 reports.

Historical Background - Current Use ofAntivehicle Mines

Modern landmines were first used in World War I responding to the threat of tanks. In World War II landmines became a serious threat when pressure fuzed antitank mines and bounding antipersonnel mines were widely used.

During World War II landmines were developed to a high degree. This includes a variety of antitank (AT mines), antivehicle (AV mines), dual-purpose, and antipersonnel mines (AP mines) with a variety of fuzes. Historical reports indicate that the former Soviet Union used approx. 220 million AT mines ; Germany 80 million and the USA about 17 million. 18% to 34% of all World War II tank kills were directly attributed to AT mines. (DIA, 1992) This figure rose to 56% during the Korean War, and finally reached 70% in the Viet Nam war. However 26% of all US American soldiers for instance who died during Operation Restore Hope (Somalia) were the victims of AT/AV mines. (Wilhelm Schneck, Countermine Systems Directorate, Ft. Belvoir, VA 1995).

As a reaction to this trend nowadays many armies have shown increased investment activities by improving mine protection for their vehicles. Germany for instance is intending to spend some 144 million DM on improved mine protection for the MARDER tank. This can only be considered a response to the threat posed by AT/AV mines, since AP mines are hardly likely to pose any threat to this model of tank. The decision to procure fully-protected transport vehicles, which had been specially developed for deployment in Kosovo, also seems to have been similarly motivated. This because the vehicle is supposedly armored such that not even anti-tank mines or anti-tank grenades can damage it (Handelsblatt, Sunday, 31 October 1999).

In principle minefields may contain any type, mix, or number of AT and/or AP mines and are used to:

-Produce a vulnerability on enemy maneuver that can be exploited by friendly forces.
-Cause the enemy to piecemeal his forces.
-Interfere with enemy command and control (C 2).
-Inflict damage to enemy personnel and equipment.
-Exploit the capabilities of other weapon systems by delaying enemy forces in an engagement area (EA).
-Protect friendly forces from enemy maneuver and infiltration.
(Department of the Army (1998), MINE/COUNTERMINE OPERATIONS, Field Manual 20-32, Washington, DC, 29 May 1998.)

If mines are laid to NATO SOPs then one would expect to find 3 AP mines for each AT mine (the AP are laid around the AT to protect it, forming a "cluster"). However in most developing countries the mine laying has not been as regimented as this.

However the widespread view is that AT/AV mines are not found that often in mined areas (European Security 10/99).But this seems to be an underestimation of the present situation. Even the highly incomplete UN/DHA mine database (http://www.un.org/Depts/Landmine/)

identifies at least 10 million AT/AV mines laid world-wide, not including e.g. Egyptian minefields, where a good 20 million AT/AV mines are presumed to have been in place since the World War II. This means that at least 10% of all deployed mines are AT/AV mines, but more realistic are about 20%. However a number which can not be ignored.

In Angola for instance every fifth of about 15 million deployed landmine is suspected to be an AT/AV mine. (http://www.un.org/Depts/Landmine/). Since the flare up of the civil war in 1998 incidents caused by AT/AV mines had increased dramatically. Besides this the London Times reported on the use of a new kind of landmine, designed to harm mine clearers, that is complicating demining efforts and hampering food delivery in Angola. The new mines explode when they are exposed to light or when they pick up signals from mine detectors. (London Times, 4 July 99.)

From Afghanistan it is reported that still 8 million AP mines and 2 million AT/AV mines are scattered. (http://www.un.org/Depts/Landmine/). UN officials again reported, that convoys delivering thousands of tons of United Nations food to cold, hungry refugees in northern Afghanistan are being delayed because of (AT/AV) mines. (according to ICBL media reports)

In Mozambique nearly every second of about 1 million deployed landmines is supposed to be an AT/AV mine and in Ethiopia 20% of all laid mines are supposed to be AT mines. (http://www.un.org/Depts/Landmine/). According to the Washington based Embassy of Ethiopia the Eritrean military has extensively and indiscriminately planted thousands of landmines in the course of its nineteen-month invasion and occupation of Ethiopian territory. In fact, approximately one million anti-personnel and anti-tank mines are scattered across the border areas from western Tigray to northern Afar by both Eritrea and Ethiopia. To add to the danger posed by the landmines, they are unmarked, no map of the minefields exists and the mines are being used against civilian populations. (Embassy of Ethiopia (Washington, DC), November 23, 1999)

"...In Rwanda, food distributions in Ruhengeri and western Gitarama prefectures remain suspended after anti-tank mine incident in early September in Ruhengeri..." (WFP Emergency Report No. 38 of 1998, Date: 25 September 1998). Similar events are occurring in the Angolan civil war, where AT/AV mines – fitted with modern light-sensitive fuzes manufactured in Yugoslavia – are used to block paths and roads, which is currently preventing the population there from receiving vital food supplies. The mines also target demining teams, who now feel barely able to clear these extremely dangerous mines. According to expert opinion, clearing AT/AV mines is basically significantly more dangerous, time-consuming and thus more costly than is the case with AP mines. This alone provides a good argument for voting in favour of extending the ban. Not least, these demining activities indirectly tie-up resources urgently needed to aid victims.

Also In Burundi, for instance, UNO is expressing concern over the growing threat posed by AT/AV mines: "Anti-tank mines are becoming a growing concern on Burundi's major roads." (DHA/Humanitarian Coordination Unit P.B. 1490 Bujumbura, Burundi, 1997).

As the Namibian Society for Human Rights recently reports antipersonnel and antivehicle mine incidents are on the increase in this country, especially along the volatile northeastern border areas. (The Printers (Mysore)Ltd., Namibian Society for Human Rights, 17.2.2000)

There are also reports from Kenya that AT/AV mines blew up several vehicles in Moyale (Ethiopia-Kenya border area) in 1999, leaving a death toll of several people. Also this year police in Nairobi confirmed several incidents caused by AT/AV mines when vehicles ran over landmines in the same area. (March 23, 2000 Nairobi, Kenya (PANA) –Africa News Online). Finally also from India, Sri Lanka and Bosnia there are reports about the increasing use of antivehicle mines which causes a multitude of victims. (according to ICBL media reports). And even the Pope almost became the distinguished victim of an AT/AV mine during his visit to Sarajevo in September 1997, when an attempt was made to blow up his vehicle with 20 AT/AV mines placed under a bridge.

All these country reports make clear that on the one hand no one seriously can deny that AT/AV mines are also used against civilians deliberately, just like AP mines and that generally also antivehicle mines pose a significant threat to civilians in mine affected countries.

Types of antivehicle mines and technological development in the recent past

Basically Antivehicle Mines (fuses) fall into three categories:

Track-width mine. These mine types are designed to be activated by pressure and require direct contact with the wheels of a vehicle.

Full-width mine. Designed to be activated by several methods--acoustics, magnetic-influence, tilt-rod, radio-frequency, infrared-sensored, command, or vibration. Tilt-rod or magnetic-influence fuses are the most common fuzing systems.

Off-route mine. Designed to top or side attack a target vehicle. Mostly these mines are activated with acoustic or seismic signals. When activated, an infrared-sensored, explosive-formed penetrating or a shaped-charge rocket warhead sublet is launched; and the warhead acquires the target.

Meanwhile most so called „modern“ AT/AV mines have reached technological standards which incorporate following features:

-Detonation independent of target speed

-Warhead kill capability

-Advanced influence fuze (magnetic)

-Hand emplaced or scatterable

-Full width attack capability

-Anti handling/Anti disturbance device to prevent manual disruption (Jane’s Information Group,1995: Trends in Land Mine Warfare)

Like AP mines AT mines were originally produced in steel, though the Soviet Union experimented with wood, and the Germans used pottery, glass and Bakelite as the external case. This made the mines harder to locate using electronic mine detectors. The most significant change in mine design came with the use of plastic. This is tough, light, and can be coloured to assist camouflage. It will not rust or deteriorate and since modern mines have practically no metal parts, they hardly cannot be detected with electronic mine detectors. Along with plastic came the electronics revolution. Electronics have not only changed modern mine designs, they have also given new life to older weapons. The large fuse wells in many

anti-tank mines will accommodate fuses which are triggered by either seismic signals or the magnetic field of an vehicle.
A further central characteristic of modern landmine systems is their scatterability. Nearly every modern mine can be scattered with mine-laying systems e.g. artillery rockets, with helicopters or with so-called dispenser weapons (stand-off weapons) by combat aircrafts (see picture). Thus in a few seconds, a huge number of mines can be scattered indiscriminately from a great distance over a large area. These scatterable mines can be strewn in a variety of ways. Different types of mines such as anti-personnel mines, anti-tank mines or so called submunitions, can be scattered in a mix or separately over a target. Marking minefields to protect civilians is generally impossible when using scatterable mines.

As the Ottawa Convention was being drawn-up, the fear was often expressed that this Convention would bring in its wake extensive further technological development of non-prohibited mine systems. In retrospect, this fear appears to have been warranted. Some State Parties to the Convention have in many cases already completed integration of AP effects (e.g. anti-handling devices) into their AT/AV systems, which has also made it significantly easier for those states to support the Ottawa process. From 1990-1999 Germany for instance spent a good DM 2.5 billion on modernizing (procurement of almost only antivehicle mines) the mine equipment of its Federal Armed Forces. Yet despite that Germany, the UK, the USA and Australia will all continue to be involved in modernization and procurement activities over the next few years. During that period, Germany will spend at least DM 745 million on militarily-motivated mine technology [landmines (around DM 300 million), military demining equipment, mine protection of tanks]. For quite some time altogether about 20 countries with credible defense budgets are involved in studies related to anti-tank mine replacements.(Jane's Information Group,1995: Trends in Land Mine Warfare). Besides this some military experts expect that it will be more difficult to obtain as both defense budgets shrink and anti-tank warfare assumes a lower priority. Whereas the upgrade of electronic fuzes designed to prolong the life of older mines is described as the main development area of landmine technology.

Since a few years a lot of companies, in example Bofors (Sweden), Dynamit Nobel Graz (Austria), Valsella or Tecnovar (both Italy) as well as a number of governments have offered improved mine systems that incorporate antidisturbance resp. antihandling mechanisms. A lot of these mines are identical in appearance (look-a-like) to their companion versions which are not equipped with AHD devices (view Table 1). These mines are designated especially popular among Third World countries and increase the risk of demining operations.(DIA, 1992). Besides this fuzes (e.g. tilt-rod fuzes) are also being offered for retrofit with older AT/AV mines.

Non-signatories such as Pakistan, India, Russia and the USA are currently having alternative APM weapons and/or modern mine systems ("self-healing minefields") developed at considerable expense (Defense News, 20.09.1999).

The key focus of mine modernization activities is on developing mines/mine systems that can be remote-delivered, that can be programmed, that utilize new explosives and multiple sensors/fuzes to generate increased and certain destructive power, and that can be remote-controlled. Furthermore, almost all improved AT/AV mines are equipped with or equipable (2 or more fuze wells) with anti-handling/anti-disturbance devices which mean they can be activated by people. As such they are clearly also de facto AP mines.

A glance at current patent statistics for landmine technology reveals uninterrupted and comprehensive development activity in the field of modern mine technology. Here it is European, and especially German, companies which are still seen to be particularly active.

Patent activities in landmine technology 1/1990 - 5/2000 - Major Companies

Country	Company	Landmines **F42B023**	Landmine components **F42B023-24**	Landmine fuzes **F42C014-08**
A	HIRTENBERGER AG HIRTENBERGER PATRONEN AG	3	1	-
A	DYNAMIT NOBEL GRAZ GMBH	1	1	1*
CH	SCHWEIZER EIDGENOSSENSCHAFT W & F BERN	2	-	-
ES	EXPLOSIVOS ALAVESES SA	1	1	-
F	GIAT INDUSTRIES LUCHAIRE DEFENSE SA	23	12	11
F	THOMSON CSF THOMSON DASA ARMEMENTS (TDA), THOMSON BRANDT ARMEMENTS, THOMSON TRT DEFENSE SA	16	5	5
F	ETAT FRANCAIS ARMEMENT	2	-	3
F	LACROIX TOUS ARTIFICES	1	-	-
GER	RHEINMETALL AG MAK SYSTEM GMBH, MAUSER WERKE OBERNDORF GMBH, OERLIKON-CONTRAVES PYROTEC AG, RHEINMETALL GMBH, RHEINMETALL INDUSTRIE AG, RHEINMETALL WAFFE & MUNITION GMBH, STN ATLAS ELEKTRONIK GMBH, TZN FORSCHUNGS & ENTWICKLUNGSZENTRUM	13	3	8
GER	DAIMLER-CHRYSLER AEROSPACE DAIMLER-BENZ AEROSPACE AG, DORNIER GMBH, LFK LENKFLUGKOERPERSYSTEME GMBH, MESSERSCHMITT BOELKOW BLOHM GMBH, THOMSON DASA ARMEMENTS (TDA)	28	7	9
GER	DYNAMIT NOBEL AG DYNAMIT NOBEL EXPLOSIVSTOFF & SYSTEMTECHNIK GMBH	46	18	13**
GER	DIEHL STIFTUNG & CO DIEHL GMBH & CO, FLENSBURGER FAHRZEUGBAU GMBH	30	1	6
J	BOEICHO GIJUTSU KENKYU HONBUCH	6	1	2
J	NISSAN NISSAN JIDOSHA KK, NISSAN MOTOR CO LTD	2	1	-
J	ISHIKAWA SEISAKUSHO	5	-	1
J	MITSUBISHI MITSUBISHI HEAVY IND CO LTD, MITSUBISHI JUKOGYO KK	1	-	-
J	TOSHIBA TOSHIBA TESCO KK	2	-	2
S	SAAB-CELSIUS (BOFORS AB) BOFORS AB/PA, BOFORS MISSILES AB/PA, FFV ORDNANCE, SAAB MISSILES AB/PA	4	-	1
UK	BRITISH AEROSPACE PLC ROYAL ORDANCE PLC	2	2	-
UK	UK SEC FOR DEFENCE	1	-	2
UK	EMI LTD	1	1	2

US / GER	HONEYWELL INC HONEYWELL REGELSYSTEME GMBH	5	1	2
US	US SEC OF ARMY&NAVY	2	-	-

Source: World Patent Index, Period: 1/1990-5/2000 (main classes and sub classes)
Notes: Data given above are not complete because they represent only public available patents. All patents are holded by the named companies, their subsidiaries, predecessors or within joint ventures. Due to joint ventures multiple entries of patents are possible. *Including Patent classification F42C007-02/mechanical contact fuzes.

Patent classifications: F42B023-00 Landmines, F42B023-24 Landmine components, F42C014-08 Fuzes characterised by the ammunition class or type - for all landmines.

Types of antivehicle mines that can be initiated by an unintentional/innocent act

Generally within the antipersonnel definition of the Ottawa treaty the word "designed" creates scope for interpretation, grey areas and loopholes. Besides this it is an astonishing fact that „anti-tank-mines" are not defined within the Ottawa Convention or the CCW Protocol II which on the other hand conceals the actual problem. The term „anti-tank mine", which should properly be amended to „antivehicle mine", is the current definition for a mine that is **not** an antipersonnel mine. But even military experts confirm, that there are a number of „anti-tank mines" that can be initiated by people (see also table 2), including mines fuzed with tilt rods, breakwires, or operating under moderate loads.(Jane's Information Group,1995: Trends in Land Mine Warfare)

Activation of an AP mine usually requires direct contact with its fuze. An AT/AV mine can be activated in the same way, although in many cases there is a considerably more complex range of possible ways to detonate them. If for instance a person steps on an AP mine without touching its pressure-activated fuze, the mine usually does not explode. However, if this happens with a pressure-activated AT/AV mine which is also fitted with an anti-handling device or a tilt-rod, the mine will explode, resulting in the certain death of the victim. Besides this AT/AV mines are unable to (reliably) distinguish between military and civilian vehicles. This applies to all AT/AV mines, regardless of whether they are activated by pressure-sensitive fuzes, pull-activated fuzes, tilt-rod fuzes or by sensors, even though this is often disputed by the mine-producing industry and the military.

When AT/AV mines are fitted with an anti-handling (anti-lift, anti-disturbance) device, the potential risk to civilians is even higher (see below). Merely approaching such mines, standing close to them or touching them gently can cause them to explode, which means certain death for the victim. Anti-handling devices are, after all, designed to make the separate deployment of AP mines superfluous, and prevent an AT/AV mine from being cleared. Without a doubt, this means that AT/AV mines possess characteristics of AP mines, by virtue of the mere fact that they are victim-activated. Many states now have considerable stockpiles of anti-tank/anti-vehicle mines fitted with such anti-handling devices. These types of mines are supplied almost exclusively complete with anti-handling devices "ex factory", and older models can be easily retrofitted with corresponding fuzes (e.g. tilt-rod fuzes).

People are basically threatened by AT/AV mines when they move (either with or without a vehicle!) over/past/close to such a mine. In the view of experienced demining experts (Rae McGrath, 1997: Definitions and Anti-Handling Devices, Discussion Paper), AT/AV mines can be activated by persons/civilians **when**:

- AP mines are used to detonate AT/AV mines.

- the AT/AV mine is activated like an AP mine at a very low pressure threshold:
- AT/AV mines have a tilt-rod fuze.
- AT/AV mines are detonated like AP mines by means of a trip wire
- AT/AV mines are activated by a break wire.
- AT/AV mines are fitted with magnetic-type fuzes (electronical AHD).
- AT/AV mines are fitted with any other typ of (mechanical) anti-handling, anti-disturbance or anti-lift devices.
- AT/AV mines are detonated or activated by means of sensors. Most common are seismic sensors which react to vibrations in the ground, acoustic sensors which react to the noise made by a vehicle engine or infrared sensors ehich react to radiated heat.

  Besides this fibre-optic cables react to being driven over, and light-sensitive sensors are used with buried mines. They explode when they are exposed to light or when they pick up signals from mine detectors. Finally sensors that react to movement as well as optical sensors are often part of modern landmine technology.

Modern AT/AV mines are often equipped with a mix of sensors in which the acoustic or the seismic sensor ”wakes up” the mine, and the infrared or the optical sensor then seeks the target and finally detonates the mine. A patent analysis of sensor fuzed weapon systems verifies that these sensor combinations can involve certain problems. Especially when a target which should not be attacked, i.e. “light vehicles or animals” move in a greater distance. In this case the seismic sensor anyway activates the mine and causes next the infrared sensor, who detects a movement against the background, to trigger the mine (Patent DE 2262366 A1, MBB, 1978).

The German AT-2 mine and the Italian SB 81 AT mine are examples of mines that are under serious suspicion of violating against the Ottawa Convention and the CCW-2 landmine protocol

The German **AT-2** mine is a scatterable antivehicle mine in service with several Nato countries. The mine is equipped with an AHD. From the viewpoint of a German military official “the AT-2 mine prevents any movement of combat vehicles and dismounted soldiers“ (Major Rudi Stampfer, 1981: Minen, in: Soldat und Technik, 2/1981). And also the former UK Minister Robertson explained in an official statement that the AT-2 mine which was procured in co-operation with France, Germany and Italy is equipped with an anti handling device which causes detonation after deliberate and sustained movement of the mine. (House of Commons Hansard Written Answer for 5 May 1999)

Italy was the first country to prohibit the AT-2 mine by law. This law commits the Italian government to destroy all 45,000 AT 2 mines in possession of the Italian Armed Forces, because the mine is sensitive enough to be detonated by a person (Italian Law N. 374: Rules for the Ban of Anti-Personnel Mines, October 29, 1997)

According to German military authorities the AHD device of the AT-2 mine is not adjustable. Due to its self destruct feature the mine is designed as a “closed system”. In this connection a technical alternation of the fuze’s sensitivity should be impossible and would mean the procurement of a new mine system. This does not make sense, especially with regard to economic aspects.

The Italian made **SB-81 AR** anti tank mine. is another example for a mine under suspect to violate both the CCW Protocol II and the Ottawa Convention. The scatterable mine is equipped with a self neutralization mechanism and a (mechanical) tilt rod fuze. The SB-81 MV variant of this mine type provides a magnetic influence anti handling device. The SB 81 is in service with the Italian and Spanish Army and was exported to Iraq.

Conclusion

In summary, it seems more than clear that civilians are under threat from mines officially defined as ”non-AP mines”, i.e. that civilians can activate these mines and become their victims. Moreover, these mines are also so dangerous that it is extremely difficult to clear them, thus generating high demining costs. British manufacturers of demining equipment also believe that ”Scatterable area denial munition systems are the major threat in modern warfare.” (Aardvark Clear Mine Limited, company brochure).

At present, the willingness of military establishments and politicians to agree to a ban on AT/AV mines appears low. Nevertheless, support for an extension of the ban is growing. Besides the German Initiative to Ban Landmines, who supports a total ban of all mine types, ICRC published an information paper (entitled ”Anti-vehicle mines equipped with anti-handling devices”, May 1999) calling for a technical modification of AT/AV mines with anti-handling devices. According to ICRC, it would be possible to adjust the anti-handling device such that it does not explode when touched inappropriately or by chance.

But a purely ”technical” proposal seeks to falls short of the target. When scattering mines modified in this way, there would for instance be a high risk of malfunction, quite apart from the issue of whether the ”adjustment” itself would function reliably or not. At any rate, this method would not prevent ”normal” activation of the mine, e.g. by a school bus filled with passengers.

Also Human Rights Watch stated that “it would appear that any use of tilt rods, tripwires, breakwires, and contact wires would be prohibited under The (Ottawa) treaty, as they could clearly cause and antivehicle mine to explode from an unintenional act.” (HRW, 2000: Anti vehicle mines with antihandling devices, fact sheet prepared for the first meeting of the standing Committee of Experts on the general Status and operation of the convention, 10-11 January)

The **key arguments** in favour of extending the ban can be summarized as follows:

- AT/AV mines have been and still are being used very readily, thus cutting people off from food supplies and, like AP mines, claiming victims among the civilian population on an almost daily basis.
- Due to their enormous explosive power, AT/AV mines cause significantly more devastation than AP mines.
- AT/AV mines are often equipped with fuzes or sensors which also enable the mines to be activated by people.
- AT/AV mines fitted with an anti-handling device are by virtue of that fact also aimed against people. AT/AV mines kill indiscriminately. In this respect they are no different from the prohibited AP mines.
- For the most part AT/AV mines are significantly more difficult to clear, due to the fact that their activation by various types of fuze and sensor makes it virtually impossible to approach

them without risk. The high demining costs which that entails are usually met indirectly at the expense of the budget for mine victim assistance.

➢Many states are continuously engaged in the further development and production of AT/AV mines, in some cases involving enormous financial inputs. These resources too are being mobilized at the expense of humanitarian demining and victim assistance or, conversely, would be more appropriately deployed in those areas.

Therefore the first steps towards a ban on all (antivehicle) mines which can be detonated by an unintentional act should be:

STEP 1: Following the Ottawa "diplomatic history" all member states should be asked to reconfirm that AT/AV mine types equipped with, or suppliable with, anti handling devices and/or magnetic (influence) fuzes are banned by the treaty if they can be detonated by an unintentional act. All Ottawa Member States should also be asked to confirm that AT/AV mines, like antipersonnel mines, cause a significant threat to civilians in mine affected nations. An addendum with these confirmations should be attached to the existing treaty.

STEP 2: Almost every existing „modern" AT/AV mine type is equipped with an AHD and/or a magnetic (influence) fuze that can be detonated by an unintentional act. This would mean a significant violation against these two CCW protocol II articles. All CCW and Ottawa member states should be asked to report all existing AT/AV mine stockpiles to the UN General Secretary. Ottawa Member States should provide this information within their article 7 reports.

STEP 3: All CCW protocol II and all Ottawa member states should be asked to install a unilateral export moratorium for at least AT/AV mines with anti handling devices and/or magnetic (influence) fuzes, comparable to the export ban on AP mines already in place in a significant number of states.

STEP 4: Effect oriented mine definition should be installed in existing landmine ban treaties like the Ottawa Convention or CCW protocol II. Effects of munitions, in addition to the design of munitions, should be of primary importance when considering the legality of weapons.

Table 1
Improved antivehicle mine systems (Look-a-like) withantidisturbance features available on the world market (as off 1992; not complete)

Country	Mine with antidisturbance feature	Original mine	Mine function, mine type of antidisturbance version
Austria	ATM-2000E	PM 85, PM 3000	Magnetic influence
France	HPD-1A	ACPM, HPD, MACIPE	Magnetic influence
France	HPD-F2	ACPM, HPD, MACIPE	Magnetic influence
France	HPD-F3	ACPM, HPD, MACIPE	Magnetic influence
Italy	MATS/2	MATS/2	Pressure, blast
Italy	SB-81/AR	SB-81	Pressure, blast
Italy	SB-MV/AR	SB-MV/T	Magnetic influence
Italy	TCE/3.6	TCE/3.6	Pressure, blast
Italy	TCE/6	TCE/6	Pressure, blast
Italy	VS-1.6. AR/AN	VS-1.6.	Pressure, blast
Italy	VS-HCT4	ACPM, MACIPE (France)	Magnetic influence
Sweden	FFV 028 SN	FFV 028 RU	Magnetic influence

Source: Defense Intelligence Agency (1992): Landmine Warfare – Trends & Projections, December 1992

Table 2
Examples of antivehicle mine types which can explode from an unintentional or innocent act and which are under serious suspect to violate against the Ottawa Treaty definitions and / or the CCW Landmine Protocol 2 / Article 3.5&3.6 (not complete)

Mine type	Country	Anti handling / Anti disturbance	Trip-wire or Breakwire	Tilt rod	Magnetic-fuze / sensor
ATM 2000 E Antitank Mine	Austria	Yes			Yes
A.V.M. Antitank Mine	Austria		Breakwire		
ATM-6 Antitank Mine	Austria		Breakwire		
ATM-7 Antitank Mine	Austria		Breakwire		
DRAGON electronic fuze system	Austria	Yes			
PM 3000 Antitank Mine	Austria	Yes		Yes	
PM 83 Antitank Mine	Austria			Yes	
Pz Mi 85M Antitank Mine	Austria			Yes	
Pz Mi 88 Antitank Mine	Austria	Yes			Yes
SEMAG electronic fuze system	Austria	Yes			
PRB III Antitank Mine	Belgium	Yes			
PRB IV Antitank Mine	Belgium	Yes			
PRB M3 A1 Antitank Mine	Belgium	Yes			
PRB M3 Antitank Mine	Belgium	Yes			

Mine type	Country	Anti handling / Anti disturbance	Trip-wire or Breakwire	Tilt rod	Magnetic-fuze / sensor
PRB M966 Antitank Mine	Belgium		Yes		
PDM-1M Antiamphibious Mine	Bulgaria				Yes
PD Mi-PK Antitank Mine	Czech Republic		Tripwire		
PT Mi-Ba II Antitank Mine	Czech Republic	Yes			
PT Mi-Ba III Antitank Mine	Czech Republic	Yes			
PT-Mi-D II and III	Czech Republic	Yes			
PT Mi-K Antitank Mine	Czech Republic	Yes			
PT Mi-P Antitank Mine	Czech Republic			Yes	
PT-Mi-DI Antitank Mine	Czech Republic	Yes			
PT-Mi-U Antitank Mine	Czech Republic			Yes	
M/88 Antitank Mine fuze used i.e. with Barmine (UK)	Denmark			anti-tilt	yes
ATM-L-84 Antitank Mine	Finland		Breakwire		
KP 87 Antitank Mine	Finland	Yes			Yes
KVKM 73 Antitank Mine	Finland		Breakwire		
KVKM 81 Antitank Mine	Finland		Breakwire		
MSM MK2 Antitank Mine	Finland				Yes
ALSETEX Programmable Igniter)	France		Tripwire		
APILAS-120A Antitank Mine	France		Breakwire sensor		
APILAS-APA Antitank Mine	France	Yes	Breakwire sensor		
GIAT Lance Antitank Mine	France	Yes			Yes
HPD 1A Antitank Mine	France	Yes			Yes
HPD 3 Antitank Mine	France	Yes			Yes
HPD Antitank Mine	France	Yes			Yes
HPD F1 Antitank Mine (HPD 2 u. 2a)	France	Yes			Yes
HPD F2 Antitank Mine	France	Yes			Yes

Mine type	Country	Anti handling / Anti disturbance	Trip-wire or Breakwire	Tilt rod	Magnetic-fuze / sensor
M 51 MACI u. M52 MACI Antitank Mine)	France			Yes	
MACIPE Antitank Mine	France	Yes			
MI AC 48 Antitank Mine	France	Yes			
MI AC CC 54 Antitank Mine	France			Yes	
MI AC CC 56 Antitank Mine	France			Yes	
MI AC CP 48 Antitank Mine	France	Yes		Yes	
MI AC CP 48/55 Plate-Charge Antitank Mine	France			Yes	
MI AC Plate Charge 1951	France			Yes	
MI AC CP 48T Antitank Mine	France	Yes		Yes	
MI AC DISP F1 Antitank Mine	France	Yes			Yes
MI AC ID 47 Antitank Mine	France	Yes			
MI AC ID 51 (GRILLE) Antitank	France	Yes			
MI AC ID 51 Antitank Mine	France	Yes			
MI AC ID 52 Antitank Mine	France	Yes			
MI AC ID CC 51 Antitank Mine	France	Yes			
MI AC PED GIAT Antitank Mine	France		Breakwire sensor		
MI AC PM Antitank Mine	France	Yes			
AT-Mine Type 542-L	France	Yes			
AT I Antitank Mine	Germany	Yes			
AT II Antitank Mine	Germany	Yes			Possible
DM-12 Antitank Mine (PARM-1)	Germany		Breakwire sensor		
DM-21 Antitank Mine	Germany			Yes	
DM 31 see also FFV 028 SD	Germany	Yes			Yes
MIFF Antitank Mine	Germany	Yes			Yes
MUSPA Antivehicle mine/Antipersonnel mine	Germany	Possible			

Mine type	Country	Anti handling / Anti disturbance	Trip-wire or Breakwire	Tilt rod	Magnetic-fuze / sensor
COBRA Area defence mine	Germany	Yes			
TM-62P3 Antitank Mine (EX-GDR)	Germany	Yes			
UKA-63 Antitank Mine	Hungary	Yes		Yes	Yes
NR 25 Antitank Mine	Netherlands	Yes			
MN-111 Antitank Mine	Poland	Yes			Yes
MN-121 Antitank Mine	Poland	Yes			Yes
MPP-B Antitank Mine	Poland				Yes
TM-62B Antitank Mine	Poland	Yes	Yes		
TM-62D Antitank Mine	Poland	Yes			Yes
TM-62M Antitank Mine	Poland	Yes			
TMN-46 Antitank Mine	Poland			Yes	
SB-81 Antitank Mine licence production	Portugal	Yes			
SB-81/AR Antitank Mine licence production	Portugal	Yes		Yes	
MC-71 Antitank Mine	Romania			Yes	
CETME Antitank Mine	Spain	Yes			
M453 copy of SB-81 (Italy)	Spain	Yes			
Mine Fuze 15 (ATF 1)	Sweden			Yes	
FFV 016 Antitank Mine	Sweden		Yes		
FFV 028 Antitank Mine	Sweden	Yes			Yes
FFV 028 RU Antitank Mine	Sweden				Yes
FFV 028 SD Antitank Mine	Sweden	Yes			Yes
FFV 028 SN Antitank Mine	Sweden				Yes
M/41-47 Antitank Mine	Sweden	Yes			

Mine type	Country	Anti handling / Anti disturbance	Trip-wire or Breakwire	Tilt rod	Magnetic-fuze / sensor
M/47 (B-C) Antitank Mine	Sweden	Yes			
M/47-52B Antitank Mine	Sweden			Yes	
M/52 Antitank Mine	Sweden			Yes	
M/52 B Antitank Mine	Sweden	Yes		Yes	
MI 101 Antitank Mine	Sweden	Yes			
MI 102 Antitank Mine	Sweden	Yes			
MI 103 Antitank Mine	Sweden	Yes			
ADDER Antitank Mine	UK	Yes			
AHM Antihelicopter Mine	UK	Yes			
APAJAX Antitank Mine	UK	Yes			
Barmine Antitank Mine	UK	Yes			
FWAM	UK	Yes			
IMP Antitank Mine	UK	Yes			Yes
L9 Antitank Mine	UK				Yes
Mk-7 Antitank Mine	UK	Yes		Yes	
ATIS Antitank Mine	Italy	Yes			Yes
BAT/7 Antitank Mine	Italy	Yes			Yes
FD Antitank Mine	Italy				Yes
G50 Antitank Mine	Italy	Yes			
Mine B Mk1 Antitank	Italy	Yes			
SACI 54/ 5/ 7/ 9 Antitank Mines	Italy	Yes			
SACI IMAC-5/ 7/ 10 Antitank Mines	Italy	Yes			
SATM Antitank Mine	Italy	Yes			Yes
SB-81 Antitank Mine	Italy	Yes			
SB-81/AR Antitank Mine	Italy	Yes		Yes	
SBMV / 1 Antitank Mine	Italy	Yes			Yes
SB-MV / AR Antitank Mine	Italy	Yes			Yes
SH-55 Antitank Mine	Italy	Yes			
TC / 3.6 Antitank Mine	Italy	Yes			

Mine type	Country	Anti handling / Anti disturbance	Trip-wire or Breakwire	Tilt rod	Magnetic-fuze / sensor
TC / 6 Antitank Mine)	Italy	Yes			
TMP-1 Antitank Mine	Italy	Yes			
TMP-2 Antitank Mine	Italy	Yes			
VS-1.6 Antitank Mine	Italy	Yes			
VS-2.2 Antitank Mine	Italy	Yes			
VS-3.6 Antitank Mine	Italy				
VS-6.0 Antitank Mine	Italy	Yes			
VS-9.0 Antitank Mine	Italy	Yes			
VS-AT4-EL Antitank Mine	Italy	Yes			
VS-HCT Antitank Mine	Italy	Yes			Yes
VS-HCT2 Antitank Mine	Italy	Yes			Yes
VS-HCT4 Antitank Mine	Italy	Yes			Yes
VS-SATM1 Antitank Mine	Italy	Yes			Yes
MPR - M85	Former Yugoslavia	Yes			
TMA-1A	Former Yugoslavia	Yes			
TMA-2	Former Yugoslavia	Yes			
TMA-3	Former Yugoslavia	Yes			
TMA-4	Former Yugoslavia	Yes			
TMA-5	Former Yugoslavia	Yes			
TMM-1	Former Yugoslavia	Yes			
TMRP-6	Former Yugoslavia	Yes		Yes	
BLU-91/B GATOR Antitank Mine	USA	Yes			Yes
M6A2 Antitank Mine	USA	Yes			
M7A2 Antivehicle Mine	USA	Yes			
M15 Antitank Mine	USA	Yes			
M19 Antitank Mine	USA	Yes			
Remote Anti-armour Mine (RAAM)	USA				Yes
M21 Antitank Mine	USA			Yes	

Mine type	Country	Anti handling / Anti disturbance	Trip-wire or Breakwire	Tilt rod	Magnetic-fuze / sensor
PTM-3 Antitank Mine	Russia				Yes
TM-46 & TMN-46	Russia	Yes			
TM-57 Antitank Mine	Russia	Yes			
TM-72	Russia	Yes			
TMK-2 Antitank Mine	Russia			Yes	
TM-89 Antitank Mine	Russia				Yes

Sources: DOD Humanitarian Demining Website Database http://www.demining.brtrc.com/. DOD, 1997 Int. Deminers guide ORDATA CD-ROM, Jane's Mines and Mine Clearance (1999-2000). Pionierschule und Fachschule des Heeres für Bautechnik, Minendokumentationszentrum (1993): Minenhandbuch Somalia, München, Mai 1993. Ministerrat der Deutschen Demokratischen Republik (1988): Pionierkampfmittel der NATO- und französischen Landstrietkräfte. Norwegian Peoples Aid Website: www.angola.npaid.org, Jane's Mines and Mine clearance (1999): http://jmmc.janes.com/.

Terms

Anti disturbance (AD)
A fuze designed to operate when moved

Anti-handling
Another term for anti-disturbance

Anti-handling device (AHD)
A device fitted to, added on, placed under attached to or near that acts as part of of a mine or munition mechanism, which can be electrically or mechanically operated when the mine or munition is disturbed.

Magnetic influence
A fuzing principle in which the device is initiated by the change of the magnetic field caused by the magnetic signature of its target resp. an object containing metal.