MEETING OF THE STATES PARTIES TO THE CONVENTION ON THE PROHIBITION OF THE USE, STOCKPILING, PRODUCTION AND TRANSFER OF ANTI-PERSONNEL MINES AND ON THEIR DESTRUCTION

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Key excerpts from the summary report of the
Technical Expert Meeting on anti-vehicle mines with sensitive fuses
or with sensitive anti-handling devices[*]

1. PURPOSE OF THE TECHNICAL EXPERT MEETING

The international community has devoted considerable resources in recent years to addressing the problems caused by anti-personnel mines. The primary purpose of these efforts has been to prevent civilian casualties. However, the fact that certain anti-vehicle mines with sensitive fuses or sensitive anti-handling devices can also be detonated by the presence, proximity or contact of a person has long been highlighted by organizations concerned with the global landmine problem. Some States have prohibited and destroyed some anti-vehicle mine systems which they consider would pose a similar threat to civilians as do anti-personnel mines.

The issue of sensitive anti-vehicle mines was considered in the context of negotiations of the 1997 Convention on the Prohibition of Antipersonnel Mines, in subsequent meetings of States Parties and in the intersessional work carried out in Standing Committees since 1999. The Co-Chairs of the Standing Committee of Experts on the General Status and Operation of the Convention on the Prohibition of Anti-personnel Mines reported to the Second Meeting of States Parties (11-15 September 2000) that *The Committee [in January and May 2000] discussed matters pertaining to Article 2, particularly matters related to anti-handling devices and the sensitivity of anti-vehicle mines' fusing devices. Ideas, like examining these issues through informal expert work and working towards the agreement by States Parties on an understanding on the matter were put forward. There was no agreement on proceeding with either idea at this time, although an ICRC initiative to discuss these matters was welcomed.*

On the basis of this statement, the ICRC offered to the December 2000 meeting of the Standing Committee to host a technical expert meeting in March 2001 with the objectives of: (1) identifying specific technical measures which may be

[*] The meeting, held from 13 to 14 March 2001, was hosted by the ICRC in Geneva. See document APLC/MSP.3/2001/INF/3, reproduced in English only, for the full report. This summary report does not necessarily reflect the position of the ICRC.

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taken by States to minimize the risk that a person might activate the fusing mechanism of an anti-vehicle mine, (2) identifying specific technical measures which may be taken by States to minimize the risk that a civilian might activate the anti-handling device of an anti-vehicle mine by accidentally disturbing it, and (3) identifying best practices as regards the design and use of anti-handling and fusing mechanisms for anti-vehicle mines. For the purpose of the meeting the term "anti-vehicle mines" was considered to cover all landmines other than anti-personnel mines

2. ANTI-VEHICLE MINES EQUIPPED WITH SENSITIVE FUSES

The following fusing mechanisms were discussed in detail: pressure-activated fuses, tripwire-activated fuses, breakwire-activated fuses, tilt-rod-activated fuses, magnetically activated fuses, acoustically activated fuses, seismically activated fuses, infrared-activated fuses, multiple-sensor fusing mechanisms and other fuses.

2.1 Pressure-activated fuses

Problem description: Some anti-vehicle mines equipped with pressure activated fuses are set off by pressures as low as 10, 25, 30, 45 or 50 kilograms, that is to say by pressures equivalent to the weight exerted by a person.

Possible best practices as regards design: The expert group recognized that certain low-pressure anti-vehicle mines could be activated by a person. Some experts strongly recommended that anti-vehicle mines should not be capable of being activated at a pressure of less than 150 kg. Where possible, anti-vehicle mine should be designed in such a way that pressure must be exerted over a significant area rather than at a single point.

2.2 Tripwire-activated fuses

Problem description: Some anti-vehicle mines are equipped with tripwire-activated fuses that are suspended over the road and can easily be activated by a person exerting a low pull pressure (between 1 and 4 kg).

Possible best practices as regards design: Several experts thought that tripwire mechanisms should not be used as the only fuses on anti-vehicle mines. According to these experts, it was not a viable option to use tripwires this way and anti-vehicle mines equipped with such mechanisms should be regarded as anti-personnel mines. The use of tripwires as fusing mechanisms on anti-vehicle mines was not considered to be common practice and several experts indicated that such systems should be removed from arsenals, as was being done.

2.3 Breakwire-activated fuses

Problem description: Some off-route anti-vehicle mines use breakwires stretched out in line with the mine. The mine explodes when the wire is crushed (in the case of a fibre-optic sensor cable) or broken (in the case of a fine breakwire) by a weight equivalent to that of a person stepping on it. The term "breakwire" very often includes fibre-optic sensor cables. A distinction is made hereafter between breakwires made out of fine wires and breakwires made out of fibre-optic sensor cables.

Possible best practices as regards design: Breakwire-activated fuses, whether made out of fine wires or fibre-optic cables, can easily be activated by a person and should not be used as the sole fusing mechanisms on anti-vehicle mines. If used, they should be combined with other fuses that can discriminate between vehicles and persons.

2.4 Tilt-rod-activated fuses

Problem description: Some anti-vehicle mines are equipped with tilt rods that activate the mines when a low pressure (1.5, 8, 10, 14.5 or 21 kilograms) is exerted on the rods at an angle varying between 20 and 36 degrees.

Possible best practices as regards design: Several experts pointed out that it was difficult to identify an effective means of preventing tilt-rod-activated fuses from being accidentally activated by a person while maintaining their military role. Several experts suggested that tilt rods should be replaced with more discriminating fusing systems which used multiple sensors, as to some extent was already being done.

2.5 Magnetically activated fuses

Problem description: A magnetically activated fuse operates by measuring the amount of metal in its immediate vicinity. Military publications and the material provided by manufacturers warn not to approach anti-vehicle mines equipped with magnetic fuses since they may be activated by the presence of metallic objects.

Possible best practices as regards design: Manufacturers should have no need to design these fuses in such a way that they could be activated by an amount of metal less than that contained in a vehicle, as this would defeat the intended military purpose. Magnetically activated fuses should be used with secondary fuses to ensure that a vehicle is present before the mine detonates.

2.6 Acoustically activated fuses

Problem description: Acoustically activated fuses are equipped with electronic sensors which determine the acoustic signature of a target. Such signatures could include that of a person.

Possible best practices as regards design: Such fuses should not be designed in such a way that they could be activated by the acoustic signature of a person (e.g. a voice, footsteps). To further enhance their capacity of discrimination they should not be used alone on anti-vehicle mines.

2.7 Seismically activated fuses

Problem description: Seismically activated fuses react to specific seismic frequencies and could, at least theoretically, be activated by human passage.

Possible best practices as regards design: Such fuses should not be designed in such a way that they could be activated by the seismic signature of a person (e.g. footsteps). To further enhance their capacity of discrimination they should not be used alone on anti-vehicle mines.

2.8 Infrared-activated fuses

Problem description: Infrared-activated fuses can function in an active or passive role, reacting to the heat of certain objects and possibly even of persons.

Possible best practices as regards design: Infrared-activated fuses should not be used alone on anti-vehicle mines and it is unlikely that they will be. Some experts suggested that active infrared-activated fuses should be avoided, particularly when used alone, since their "tripwire" capability could cause anti-vehicle mines to function as anti-personnel mines.

2.9 Double-sensor and triple sensor fusing mechanisms

Description: These types of fusing mechanisms tend to be highly sophisticated and are usually equipped with various combinations of fuses (e.g., magnetic/infrared/seismic/acoustic).

Possible best practices as regards design: Double-sensor and triple-sensor fusing mechanisms can help discriminate between vehicles and persons. When such is their purpose, their increased use is desirable.

3. Anti-vehicle mines equipped with sensitive anti-handling devices

The accurate definition of the term "anti-handling device" was the first issue to be addressed since technically such devices could be placed under the follow headings: anti-handling devices, anti-disturbance devices and anti-movement devices. Since it was the understanding of a number of experts that the term "anti-handling device" covered anti-disturbance and anti-movement devices as well, hereafter only the term "anti-handling" device is used.

Problem description: Many anti-vehicle mines equipped with anti-handling devices, in particular remotely-delivered mines, can easily be activated when civilians who are making no attempt to clear them accidentally disturb them. The threat presented by remotely delivered mines fitted with anti-handling devices is compounded by the fact that they are typically laid on the surface of the ground, often hidden by debris or vegetation, where it is easier for them to be inadvertently activated. Such mines have a tendency to be more potent than buried mines since their explosive force is less contained and explosions are typically accompanied by secondary anti-personnel fragmentation. Anti-handling devices fitted to this type of mine include mercury tilt switches or electronic sensors that are activated when a person touches, handles or moves the mine or when the mine is lifted or tilted at an angle of more than 20 to 40 degrees.

Possible best practices as regards design: The experts had difficulty providing any specific technical recommendations as to how anti-handling devices could be designed in such a way as to minimize the risk that they might be accidentally activated by civilians while ensuring that they could still fulfil their military function. Several experts thought that it would be technically difficult to differentiate between the disturbance caused by inadvertent contact and an attempt to tamper with or clear the anti-vehicle mine.

Further research on this technical matter was encouraged. It was also suggested that States review the sensitivities of the anti-handling devices which they currently employ, determine how existing sensitivities had been established and work out the minimum sensitivity needed to ensure that such devices would fulfil their military function.

Many experts felt that the problem could be partly solved by reducing the active lifetime of anti-vehicle mines and their anti-handling devices. To this end, remotely-delivered anti-vehicle mines could be equipped with self-destruction or self-neutralization mechanisms backed up by self-deactivation mechanisms.