GROUP OF GOVERNMENTAL EXPERTS OF THE STATES PARTIES TO THE CONVENTION ON PROHIBITIONS OR RESTRICTIONS ON THE USE OF CERTAIN CONVENTIONAL WEAPONS WHICH MAY BE DEEMED TO BE EXCESSIVELY INJURIOUS OR TO HAVE INDISCRIMINATE EFFECTS

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Mines other than Anti-Personnel Mines (MOTAPM)

Sensitive Fuzes for Anti-Vehicle Mines

(Overview of Fuzes and Recommendations for Best Practice)

Working Paper (Synopsis) prepared by the Delegation of Germany

1. Regarding sensitive fuzes, Germany suggested to reach an agreement upon suitable concrete technical parameters or limits (so-called "best practice") for fuse mechanisms, which would reduce the risks of anti-vehicle mines to human beings. During the Second Session of the Group of Governmental Experts in July, the Delegation of Germany submitted an open matrix (CCW/GGE/II/WP.5/Add.1), and asked States Parties to provide information on existing fuze mechanisms and their technical functions in order to establish an overview of relevant data on fuze technology.

2. We received data from a number of States Parties which we processed and integrated in the attached synopsis, containing also information provided by the ICRC and by Humans Rights Watch. The evaluation is a first step to a common understanding of certain standards and possible consequences for AVM fuzes. The Matrix gives information on seven types of fuzes.

3. Identifying best practice regarding design and use of fuse mechanisms in order to minimize the risk of accidental or inadvertent actuation might require further contributions, thereby improving this list of existing fuze mechanisms and their technical functioning.

Sensitive Fuzes for Anti-Vehicle Mines
Synopsis of Submissions made by Commenting States

As of November 26, 2002

Type of fuze / Sensor	Technical Function	Technical Specification (1)	Limit for Personnel Risk (2)	Recommended Limit (best practice) (2)	Remarks
Pressure Sensor	Actuation by pressure beyond specified force limit	Newton (N) actuation threshold of existing fuzes: 500-5000 N	900 - 1600 N	1400 - 3400 N	Safety Factor 65 % - 278 % (100 N are approximately 10 kg)
Tilt Rod	Actuation by breaking a post or pole on top of mine by pressure	Newton (N) actuation threshold of existing fuzes: 15-210N	500 N	1000 N	Safety Factor 100% (100 N are approximately 10 kg)
Fibre-optic Wire Sensor	Actuation by squeezing a fibre optic wire	Actuation by vehicle crossing wire, which attenuates the light in a fibre optic wire	9 dB (2)	12 dB (2)	The force acting on a fibre-optic wire is depending on: - geometry of the object, which is damaging the fibre-optic wire - characteristics of the ground (environmental condition)
Magnetic Sensor	Actuation by change of a magnetic field	Actuation by tank (metallic vehicle >1000 kg) passing within a 0.5 m radius of the emplaced mine	no actuation by mine detection devices or passers by	---	The magnetic flux density is depending on: - the strength of the magnetic source (induction voltage) - distance between magnetic source and sensor (coil) - velocity of the magnetic source - for a gradient sensor: geometry of the magnetic field - earth magnetic field (environmental condition)
Scratch Wire Sensor	Actuation by contact with the bottom surface of a vehicle	Time of scratching on a metallic surface [seconds]	no risk for a person	---	The time to actuation is depending on: - velocity of the vehicle - composition of the bottom surface of the vehicle
Acoustic Sensor	Actuation by acoustic pressure	Sound Volume [phon]	70 phon (2)	80 phon (2)	The acoustic pressure of an acoustic signal is depending on: - strength of the acoustic source - distance between acoustic source and sensor - background noise (environmental condition) An additional parameter of an acoustic signal is the frequency, which depends on: - direction and velocity of the acoustic signal
Seismic Sensor / Vibration Sensor(3)	Actuation by vibration in the ground	(3)	(3)	(3)	The acceleration caused by a seismic vibrations is depending on: - strength of the vibration source - distance between vibration source and sensor - damping factor of the ground (e.g. soil, sand - environmental condition) An additional parameter of vibration signal is the frequency, which depends on:- direction and velocity of the vibration signal

(1) Technical Main Parameter

(2) All these limits are only valid for fuzes, which are using only these Technical Main Parameters for detection. fuzes could use multiple sensors and different technical parameters, which also depend on the environmental conditions (see remarks). These fuzes could not be described by a single parameter.

(3) Not discussed, because these sensors are used as alert sensor not as fusing sensor

(4) Remark: Technical data for trip- and breakwires were not reported