



Trial/Test Report Abstract

Report:

Magnetic Clutter Reduction Efficiency in humanitarian Demining

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Equipment category/Equipment:

Detection - magnet(-tools): Ring magnet, Handheld Sweep Magnet (HSM), magnet rake with rigid tines, magnet rake with flexible tines

Link to full report:

<http://www.itep.ws/pdf/MagClutTNO2008.pdf>

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Summary

The aim of the project was to quantify the expected efficiency increase in humanitarian demining operations obtained by using hand-held permanent magnets(-tools) in the 'close-in' detection phase. The tools can be used to remove metallic clutter from the top layer of the ground. Although a number of organisations has experimented with such tools, the influence on demining efficiency has not been quantified within live demining operations.

A number of selection criteria for the magnet(-tools) was chosen and assessed by means of a questionnaire amongst employees of humanitarian demining organisations. The respondents indicated weight, robustness and safety as the most important criteria. A tool, which can be swept over the working lane in a kneeling position is preferable. On the capability to manipulate the top layer of the soil with the magnet(-tool), the respondents do not agree. This may be explained by the different scenarios the respondents work in. The results of the questionnaire and investigation into earlier testing of magnet(-tools) led to the selection of a number of tools: a strong ring magnet, a weaker handheld sweep magnet (HSM), a magnet-rake with rigid tines and a magnet-rake with flexible tines.

The efficiency of humanitarian demining when using the various magnet(-tools) has been analysed in three successive trials in live minefields. One trial took place in Cambodia in collaboration with the Cambodian Mine Action Centre (CMAC) and two in Angola in collaboration with Norwegian Peoples Aid (NPA). The general set-up for the trials was to have one group of deminers working according to the original standing operational procedure (SOP) of the demining organisation and a second group working with an adapted demining procedure including the use of the magnet(-tool). The amount of cleared area per day per demining lane was recorded. Moreover, the metal found during demining was gathered in plastic buckets and the method of finding (by visual detection or with the magnet(-tool) or during excavation) was recorded.

The ring magnet is the most popular magnet-tool among the deminers due to its strength. The rake with rigid tines is not accepted for use during scanning because it is believed to cause too much pressure on the surface and therefore can detonate a mine. The rake with flexible tines was only accepted for scanning during the first trial in Angola. During the second trial in Angola the deminers did not accept the rake as soil manipulation is not a part of their SOP. The deminers believe the use of the ring magnet increases the efficiency of humanitarian demining and also makes their work easier. However, the data did not show an efficiency increase. In general, the deminers in the reference group cleared a larger area than the deminers using the magnet(-tool) (10 - 40%). On the other hand, the deminers using the magnet(-tool) found a larger amount of metallic clutter than the reference group (15 - 50%). This effect may be caused by inhomogeneous metal distribution in the demining lanes. It is also possible that the deminers in the reference group did not clear all metallic clutter from their demining lanes. The endurance trial did not average out this effect.

NPA Angola has included the ring magnet for use during excavation in a revised SOP and is considering also including the ring magnet for use during scanning. Moreover, NPA has requested assistance from TNO for the delivery and implementation of the ring magnet in all its manual demining operations in Angola.

All magnet(-tools) used during the trials were donated to CMAC in Cambodia and NPA in Angola.