As Mines Grow Old

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In most cases, the mines being cleared around the world were emplaced decades ago; yet, the techniques and equipment being used during clearance treat them as though they were new. The author looks briefly at the effects of ageing on mines and considers possible implications.

The truth is that there has been very little formal research into the effects of ageing on mines and other types of ordnance. There are many instances in which it would be difficult or foolish to second-guess how a munition may change, and there are many environmental factors and other variables that might prove critical. But while the issue is largely unexplored, there are already several examples that demonstrate the potential rewards of further investigation.

Steel Components

Perhaps the most predictable ageing effect is that ferrous components will eventually rust if exposed to water and air. Where spring-loaded fuze components are involved, the mechanism will become more liable to actuation through the failure of a component (such as a retaining pin), or seize and become completely inoperative.

In the case of a simple mechanism, such as the MEU/FTS fuze, the latter appears more likely. Combined with the likelihood of foreign material ingress (such as fine soil) around the spring and in front of the striker, long-buried and heavily corroded mechanisms of this sort are nearly viable. That does not make them safe, of course, but it does mean they are unlikely to function as intended and may make them more vulnerable to certain countermeasures.

If a steel-cased mine becomes badly rusted, it may lose its structural integrity altogether. The mine may, in turn, double as a mine-thrower mechanism that relies on the support of the casing. The main explosive charge may also begin to crumble into the surrounding soil, the consequent loss of confinement making the complete detonation of a cast TNT charge far less likely. That does not make them safe, of course, but it does mean they are unlikely to function as intended and may make them more vulnerable to certain countermeasures.

The vulnerability of woodland is also relevant to simple fragmentation mines, which are normaly placed on short wooden stakes. Once the stakes have rotted away, the mine falls to the ground. The mine body is no longer upright and unshielded, so the fuze (if still present) will not function reliably. It is also far safer and easier to demolish the mine once it is laying on the ground.

Plastic Mines

At the world agimised over the indefinite lifespan of plastic mines, few people paused to consider the many different types of plastic—metallic mine, the breakdown of a plastic casing will normally be a good thing, so long as the fuze retains its integrity.

The deterioration of ferrous fuze components can also have positive effects. The Italian VS-50 and TS-50 anti-personnel mines (copied from mines used by Iran and found throughout the world) are notorious for their resilient casing. However, the ingenuous blast-resistant mechanism incorporates a small infladable blader that perches with prolonged exposure to heat. Neither the fuze nor the plastic casing then function fully as intended, the VS-50 losing its blast resistance and the TS-50 effectively neutralising alongside.

Conclusion

Findings like these are clearly significant to deminers, where equipment selection and procedures should take account of changing mine characteristics. Particularly startling is the prospect that some mine areas might already be safe, while others of lesser threat might possibly be fenced and abandoned for a number of years to gradually self-neutralise. Certification of this ground must be more akin to area reduction than to full-scale clearance.

Furthermore, if the effects of ageing were better understood, it might be possible to deliberately accelerate the process. Other benefits might include the development and deployment of clearance equipment designed to exploit the mine's vulnerability. For example, the deterioration of a casing may lead to easily detectable explosive contamination in the surrounding area.

In summary, the deterioration of munitions, traditionally regarded with fear and suspicion, may have the potential to revolutionise our approach to humanitarian mine clearance. At the very least, it should be a major factor in the prioritisation of work. Given the existing evidence, it seems foolish to ignore the possibilities.