Researchers find WWI and WWII bombs in the ground are becoming more volatile

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Credit: Anders Kristensen from Pexels

Two ordnance specialists, one with the University of Stavanger's Department of Safety and the other with the Norwegian Defence Research Establishment, have found that due to their chemical makeup,

bombs and other ordnances still in the ground from World War I and World War II are becoming more volatile, increasing their chances of exploding should they be disturbed.

In their paper published in the journal *Royal Society Open Science*, Geir Novik and Dennis Christensen described testing they did on recovered bombs and what they found in doing so.

During WWI and WWII, massive amounts of explosives were fired at opposing forces by armies in various parts of Europe and other places. Prior research has shown that many of those explosives did not explode as intended—instead, they wound up embedded in the ground due to the force of their impact. Many are still there, some of which are found periodically during digging operations.

This past month, a 500kg bomb was discovered residing in the backyard of a home in Plymouth, U.K. That bomb was removed safely, but others are not so lucky. A bomb encountered by an excavator in Hattingen, Germany back in 2008 exploded, injuring several people.

In their new effort, Novik and Christensen found evidence that suggests the discovery of unexploded ordnances from the two world wars could become more dangerous as time passes.

The problem, the pair noted, is that many such bombs and other types of explosives of the time were made using Amatol, a material made by mixing ammonium nitrate with TNT (trinitrotoluene). The researchers explained that Amatol becomes more volatile as time passes due to slow exposure to moisture, metals in soil, and other materials. And that means such explosives are more likely to explode if they are disturbed.

To learn more about the problem, the researchers dropped heavy materials onto small samples of Amatol that had been collected from

multiple sites across Europe that were targets of bombing campaigns. Doing so showed that such bombs are highly likely to explode if they are disturbed, like when people dig gardens or construction workers dig to lay foundations for new buildings.

As empty spaces that were once the site of battles see new construction, the chances of disturbance grow. The researchers suggest extra precautions be taken to avoid injuries or even death from the explosion of such hidden ordnances.

More information: Geir P. Novik et al, Increased impact sensitivity in ageing high explosives; analysis of Amatol extracted from explosive remnants of war, *Royal Society Open Science* (2024). DOI: 10.1098/rsos.231344