
Anti-personnel mine blast

What follows is the PowerPoint presentation formatted as a scrolling webpage.

Humanitarian Demining Part 8: AP mine blast

This presentation shows you what the detonation of a large anti-personnel mine can be like, and also how it can impact on a kneeling deminer who sets it off accidentally. Most accidents in HD occur while the Victim is trying to unearth the device in a kneeling position.

What follows is a series of stop-motion photographs of a test carried out in Mozambique. The test was conducted by Dieter Guelle and I was present as advisor. I would not have tested two PPE ensembles against a single mine, but the result was probably unaffected by the presence of the second dummy.

Dieter had made articulated dummies and dressed them in the PPE being considered. If you study the pictures and look beyond the dust, you will see that one of the dummies "stands" upright during the blast. Its visor is torn away and then lands back on the dummy's face. It is common for visors to be torn away by the blast front, but at 60cm from the seat of the explosion the fragments have overtaken the blast front - so they strike the visor just before it is torn away. You can see trace lines of the fragments in the second slide, before the dummies are lifted upright by the blast front. The dummies then collapse.

As the sequence progresses you can see a pall of smoke from unburned TNT. Then you see dust on the ground being

lifted like a mist and drifting towards the seat of the explosion. This is because, as the high explosive expands (it is effectively a small solid trying to turn "instantly" into a large volume of gas), there is "low pressure" behind the blast front (sometimes easier to comprehend when inaccurately called a "partial vacuum") which sucks air and dust from the surrounding area.

The mine used was a [GYATA-64](#) containing 300g of TNT. This was the largest threat mine in the area, and is also the largest AP blast mine found. A No.8 detonator was pressed into its detonator-well with a few grams of industrial grade Plastic Explosive to ensure a tight fit. The detonator was then fired electronically from a safe distance.

Many people are surprised to hear that all the evidence from real accidents suggests that the victims would have survived without serious injury, except perhaps to their hands. A temporary hearing loss would be expected (with a small permanent loss that the victim would probably be unaware of), and the victims would have had dust in their eyes. That dust would have been drawn in *behind* the blast front and so not moving at damaging speed.















The entire sequence took under two seconds. The day was hot and with no obvious wind, so when the dust drifted to the left it was not being dragged by a high wind. Notice that the "victims" stood up far more quickly than they collapsed and that they were not thrown significantly back from the blast. This reflects the way that a deminer moves in real accidents very well.

My thanks to Dieter Guelle.