Mask-Visor blast test

Italy, 2010

Prepared by: A.V.Smith, AVS Mine Action Consultants

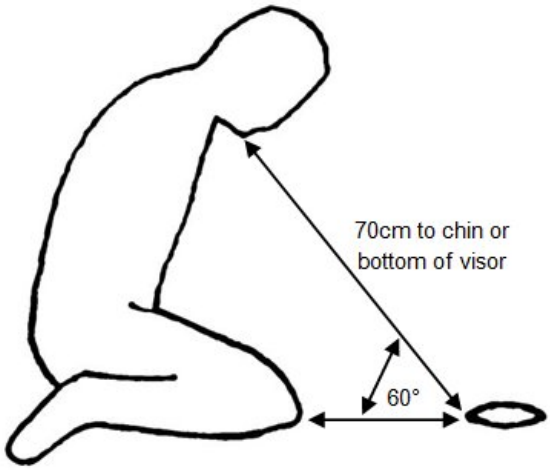
This report records a controlled blast test conducted in a quarry near Parma, Italy on 28th May 2010.

The equipment tested was an AVS design Mask-visor manufactured by Security Devices in Zimbabwe. It is designed to provide blast protection to workers engaged in Humanitarian Demining.

TEST PARAMETERS

The Mask-visor has been previously blast tested using DRDC Canada's PE alternative to TNT.
See http://www.secdevinc.com/Mask-visor%20blast%20testing.pdf.
Although the Mask-visor performed well, the use of PE instead of TNT did not give some users full confidence, so this test was arranged.

The test parameters were drawn from those published at http://www.nolandmines.com/Generic%20SOPs.htm Chapter 2, page 6.



INDEPENDENT WITNESSES

The blast test was independently witnessed by:

1. A team led by Danilo Coppe from SIAG Blasting Works, Parma, Italy;
2. A LOCOSTRA project team from the University of Genoa led by Emanuela Cepolina;
3. The blast visor specialist and director of Elegant Design Solutions, UK, Ed Pennington-Ridge;
4. The independent demining researcher, UK, Cris Chellingsworth; and
5. A representative of the Italian army

The test was conducted under the direction of Andy Smith of AVS Mine Action Consultants, UK.

AMBIENT CONDITIONS

Weather conditions were a largely clear sky with high cloud. Temperature 22ºC with humidity at 72% recorded with a Sekonda instrument. The test occurred at approximately 11 am. Heavy rain occurred two hours later.

The ground was of compacted rock and clay soil (driven over with heavy machinery). It was disturbed as little as possible and the charge was placed with the explosive 1.5cm beneath the lid, and the lid flush with the ground surface. The gap around the charge was backfilled.

THE MASK-VISOR

The Mask-visor is made using heat-formed 5mm untreated polycarbonate as required in the IMAS. It was made by the company that manufactures more blast-visors used in Humanitarian Demining than any other supplier.

THE EXPLOSIVE CHARGE

The explosive charge was a plastic pot filled with a weighed 240g of pressed TNT (explosive recovered from Valmara-69 mines). Electronic detonation was controlled by Danilo Coppe from SIAG Blasting Works.

PRESENTING THE MASK-VISOR

The Mask-visor was mounted on a tripod at a measured distance of 70cm from the closest edge of the mine at 60º from the ground surface. The Mask-visor was attached to a head band on the tripod using its Velcro fastenings. The head-frame was tied by a ten metre length of paracord intended to restrain its flight.

ANTICIPATED OUTCOME

The anticipated outcome can be predicted because the same material has featured in many accidents and been blast tested before. Because the design of the visor face is new, with separate parts, it was important to know whether the lower parts of the visor would be separated and whether the area around the fixings would show signs of stress damage.

It was predicted that the Mask-visor would be thrown backward and the sun-shield scratch-protector would separate. The face of the visor would be pitted and marked by the stones surrounding the explosive charge but would retain its integrity.

CRITICAL FAILURE

A critical failure would be any separation of the visor face into component parts, other than the loss of the sun-shield.

The Mask-visor should not separate or shows signs of stress fracture at these joints.

RESULTS

The Mask-visor performed as predicted. It was thrown up and back and restrained by the paracord tether.

The sunshield had been torn away.

A spray of pitting to 2mm showed that all parts had been heavily struck by stone fragments.

There was no evidence of damage to the fixings of the lower parts of the visor face.

CONCLUSION

The Mask-visor provided the same protection as a full-face visor made using the same materials. Its light weight and ventilation may make it more suitable for sustained wear in hot conditions than previous designs of visor.

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