

## THE PERILS OF EOD OPERATIONS IN AFGHANISTAN

By: Lieutenant Daniel A. Doran, 5<sup>e</sup> RGC



On 14 March 2004 Sgt Steeve Bolduc from 5<sup>e</sup> Regiment de Genie Combat (RGC) from Valcartier Quebec, left Camp Julien in Kabul, Afghanistan with his Explosive Ordnance Disposal (EOD) Team to conduct daily operations. The team deployed west of Camp Julien to an area approximately one kilometer north of a US led, Afghanistan National Army (ANA) Training Camp under construction. The mission of the EOD team was to dispose of a variety of unexploded ordnance (UXO) that had been reported in the area.

The sergeant and his team followed standard operational procedures (SOPs) when arriving at the site. These procedures involved a cordoning off of the area, establishing a safe area for the disposal team, in addition to a confirmation of authority to destroy the ordnance with higher command. Three separate detonations occurred during the course of the day. The first and last detonations took place without incident. However, the unexpected results of the second detonation precipitated the need for additional analysis.

During training, the required safety distance observed for the detonation of ordnance and steel cutting is 1000 meters. This distance however, is rarely observed in operations, due to restrictions of space and time. For these reasons a separate, operational set of guidelines outlined in FM 21-16 (U.S. Army) is employed, that allow applicable danger templates to be truncated under operational conditions. Based on the aforementioned reference, the safety radius for the destruction of ordnance containing less than 12.3 kg of explosives is benchmarked at 300 meters.

When EOD teams work in an area with a real enemy threat, complimented with complex terrain, it is not always possible to observe all doctrinal safety distances. For this reason, EOD technicians will conduct a risk assessment to evaluate the scope of potential collateral damage. The unique qualities of each EOD task and the unpredictable nature of antiquated or damaged explosives, makes collateral damage appreciations far from an exact science. The onus of accuracy concerning these assessments, falls uniquely on the training and experience accrued by the engineers involved. The EOD team in question was fortunate to have a well-qualified and experienced section commander to conduct such evaluations. However, regardless of the depth and breadth of experience

accumulated by an EOD technician, one can never completely eliminate the X-factor; a variable, whose effects came to light during the third and final destruction of the day.

At 1437 hrs, permission was requested from higher command to conduct the second destruction. The ordnance in question was two high-explosive (HE) 82 mm mortars (Soviet O-832DU), one 122 mm HE projectile (3OF69M Kitolov-2M CLGP), in addition to eighteen PG MG-57 fuses. Due to the deteriorated condition of the Soviet occupation-era munitions, the correct decision was made to blow-in-place (BIP). By 1450 hrs, an area of 600 meters around the UXO was evacuated and the team completed last minute preparations for the destruction. At 1500 hrs, the charges were detonated and the site was deemed all clear by 1515 hrs.

While the EOD team loaded their equipment for the short trip back to camp, US and ANA personnel at the training camp one kilometer to the south were in a state of near panic, due to a large piece of shrapnel from a 122 mm artillery round impacting inside their compound. Because of the incident, construction on the site had to be temporarily suspended, owing to the unrest among the 300 local construction workers. A terrain analysis conducted by Task Force Engineers from Camp Julien, concluded that the shrapnel had traversed a total distance of approximately 980 meters from the point of detonation to point of impact.



While the distance traveled by this piece of shrapnel still fell within the 1000-meter training safety template. It is nearly unheard of for a piece that size (6 cm x 3 cm x 1 cm - ref. Fig. 1) to attain such a great distance during destruction. This anomalous occurrence provoked a great deal of enquiry by Canadian engineers in theatre, leading to the contriving of an extensive report by the Officer Commander of 52 Escadron de Genie from 5<sup>e</sup> RGC. This report included an informative study conducted by the *Ministre De La Defense* of France, that was provided by Defense Research Establishment Suffield (DRES).

This study outlined in detail, the exceptional distances that shrapnel could travel when subjected to high elevation, above average winds and desert climate. Further, the French military formulated equations with which adjustments in safety distances could be calculated to properly take into account these factors. The calculation for the destruction of ordinance at the aforementioned site would have been laid out as follows:

Given:

Variables from the French study:

- a. Add 10 meters to danger radius (DR) for every 100 meters above 400 meters ASL (Do);
- b. Add 150 meters to DR if there is a wind speed greater than 8 m/s (Wo);
- c. Add 28.8 meters to DR for every 10°C above zero (To);

Variable values based on site conditions at 1500 hrs, 15 March 2004:

- a. Air temperature: 19.0°C;
- b. Wind speed: 11.1 Km/h;
- c. Altitude: 1914.1 meters ASL

Solution:

$$\begin{aligned}\text{Adjusted DR} &= \text{Original DR} + \text{Do} + \text{Wo} + \text{To} \\ &= 1000 \text{ m} + 10 \text{ m} [(1914.1 \text{ m} - 400 \text{ m})/100 \text{ m}] + 150 \\ &\quad \text{m} + 28.8 \text{ m} (19.0^\circ\text{C}/10^\circ\text{C}) \\ &= 1000 \text{ m} + 10 \text{ m} (15.14) + 150 \text{ m} + 28.8 \text{ m} (1.9) \\ &= 1356.12 \text{ meters}\end{aligned}$$

In short, the study indicated that with unfavorable winds, high temperatures and significant altitudes, debris from UXO disposal could be propelled in excess of 1350 meters. Distances of this magnitude clearly indicate, that safety distances for training and operations in this type of terrain would have to be enlarged by as much as 50%!

While safety distances of this magnitude are not always possible under operational conditions, the experiences of the 5<sup>e</sup> RGC EOD teams, coupled with the French Army study, have assisted in providing a clearer perspective on the potential implications of adverse and abnormal conditions concerning the destruction of UXO. Further, the incident will serve as a productive and relevant contribution to the professional development of the Canadian Forces School of Military Engineering as well

as the Engineer Corps as a whole, in bringing to light the additional factors that significantly affect risk assessment during the conduct of explosives destruction operations in complex environments.