Manual Demining in Afghanistan

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Technical Consultants (ATC) is the oldest, largest non-profit and NGO for humanitarian mine clearance in Afghanistan. The present director, Kefayatullah Eblagh, established it in October 1989. ATC started demining operations in early 1990, with an initial staff of 35. Since then, it has undergone significant change and expansion. ATC has developed into a highly organized and effective NGO, employing about 1,300 personnel. ATC operates under the auspices of the United Nations Office for the Coordination of Humanitarian Assistance to Afghanistan (UNOCHA) and removes ordnance from both mined areas and former battlefields. ATC also promotes mine awareness for the people living near contaminated areas, as they are exposed to the greatest risk.

The organization has run the following techniques in mine/UXO clearance activities in a decade of operation: Manual Mine Clearance; Mechanical Mine Clearance using flail machines; Mechanical Mine Clearance using Backhoe machines; Mechanical Mine Clearance using Excavators; Battle Area Clearance (BAC); and Explosive Ordnance Disposal (EOD).

ATC consists of the following sources: 24 Manual Clearance Teams of 30 people each; four EOD Teams with six operators and one team leader each; and three Mechanical Teams of 13 operational staff each.

Since 1989, ATC has deployed its teams in 20 provinces of Afghanistan and has cleared more than 70 square kilometres of mine fields and 146 sq. km of battle areas. In the course of its operations, ATC Teams have located and destroyed the following devices:

- Anti-tank (AT) mines - 2,560
- Anti-personnel (AP) mines - 127,320
- Unexploded ordnance - 483,610

Based on information collected from the cleared areas, 7,500,000 individuals have directly/indirectly benefited from ATC operations.

Motivating and Sustaining a Manual Deminer

The first goal of a deminer is to obtain money to support his family. Because of the extreme shortage of jobs in Afghanistan, the deminer is often the only breadwinner in the family.

The second consideration is that the work undertaken by the deminer is for the good of the country. It is still considered a continuation of the jihad (holy war), which was originally declared against the Russians when they invaded in 1979. Afghanistan is a strongly Islamic country, and Islam emphasizes family virtues and service to others. The Koran teaches: "He who saves a life, saves the world." These two principles of family service and service to others motivate the deminers to work on a task which, at times, is extremely tiring, repetitive and boring but is also very dangerous. Many deminers have been working in demining for 10 years (from the start of the program) and have put up with many hardships for the sake of their families and fellow countrymen.

Manual Demining: Still the Best System We Have

Manual demining is still the best system currently in use because it has been proven that the current generation of mine clearance machines can only clear about 80 percent certainty at best, whereas manual demining can give a 99.6 percent certainty.

The flail was first invented in 1942, during World War II, and apart from improvements to the prime mover, it has changed very little. The original flail machine (mounted on a Matilda or Sherman tank) was designed to remove most AT mines, but in the wartime situation, it was accepted that some mines would be missed, and as a result, some casualties would be suffered. These war casualties were considered acceptable and inevitable. In humanitarian demining, no casualties among the deminers or civilians are similarly accepted. Other mechanical methods have yet to prove that they can clear to the acceptable standard of 99.6 percent.

Machines have often been used in areas where it still requires checking by the manual deminers. Prior to the use of backhoes, manual demining of collapsed buildings and filled-in irrigation canals, which are overgrown with vegetation and may have multiple mine layers. The excavator spreads the ground by the bucketful in a clear area where it still requires checking by the manual deminers.

Come confused by the multiple "scents" and have difficulty zeroing in on a specific indication.

Machines such as the Armored Backhoe excavator have proven very useful in Afghanistan for excavating rubble from collapsed buildings, where several layers of mines have often been buried, or discovering filled-in irrigation canals, which are overgrown with vegetation and may have multiple mine layers. The excavator spreads the ground by the bucketful in a clear area where it still requires checking by the manual deminers.

The Armored Backhoes have proven to be successful and have been a useful supplementary aid and substitute for manual demining in all situations.
ATC used two flail machines from 1990 to 1995, but though they were reasonably successful in clearing mine fields on flat areas of land, they were prone to breakdown, and the facilities in Afghanistan were not in place to undertake major repairs. As a result of these problems, the flails were removed from service, as they were not cost effective.

**Manual Demining Needs to be Made Safer, Faster and More Productive**

Manual demining can only be made safer, faster and more productive if there is a significant change in detection technology, and until this happens, the process toward greater productivity will not advance quickly. The current range of mine detectors includes only extremely sensitive metal detectors. This narrow range is the crux of the problem. The metal detector picks up indications from the metallic components of the mine, but it cannot differentiate these readings from readings given by other metallic items, such as cartridge cases, shell fragments, nails and rattle pulls from soft drink cans. Statistics show that for mine fields cleared by ATC, there are approximately 450 metallic indications, which have to be investigated for every mine located. Each of these indications has to be carefully prodded and investigated. Though the probability is high that the reading is not a mine, the results of being wrong prove to be quite devastating for the deminer. Many injuries have occurred when the deminer has assumed, after many "false alarms," that the AP mine he is investigating is just another piece of scrap metal.

In certain instances, clearance of dense vegetation or rubble using a machine can speed up the process (the use of a backhoe is a good example), but the ground still has to be checked using manual mine detection methods to ensure a 99.6 percent clearance certainty. It is likely that the only real solution to the problem would be a detector that will only detect the explosion contained within the mine. A ground X-ray system or ground penetrating radar could be used and would be man portable. It would give sufficient clarity to differentiate a mine from a buried stone or other buried objects. It would be of no use to produce a detector that would give as many false alarms as a metal detector. The deminer must be able to tell a stone from a mine, especially in the rocky fields of Afghanistan. In addition, a detector must be relatively cheap, robust, easy to use and easy to repair. It would also not be efficient to replace a conventional mine detector with a machine, which may cost 10 times more than a detector and is complex, easily breaks down and has to be sent back to the manufacturer or a specialized laboratory for repair. Such a machine would mean a reduction in demining staff due to limited funds and money not being put back into the country's economy through the deminers' pay. Fewer deminers would mean fewer self-supporting families and more families reliant on foreign aid.

One new promising technology is the use of a remote airborne sensing system using small dirigibles at night to detect mines through "thermal imaging" (i.e., the heat signature given off by the mine is different from that of the surrounding soil at night). Such a system, along with an accurate plotting system with recognizable marker posts, would accurately define the position of each individual mine and the exact extent of the mined area. The deminer could go straight to the position of the mine while ignoring the ground between the mine and the edge of the suspect mine field. If remote airborne sensing proves successful, it would bring mine clearance to the immediate post-World War II success rates where the mine field clearance parties were able to cover vast areas each day (in comparison to today's rate). This capability was a result of each mine having been accurately plotted and recorded by the personnel laying the mines.

**Military Demining is often undertaken at night under conditions of great stealth and speed, clearing only narrow safe lanes so as not to alert the enemy and reveal to him that his mine field has been breached.**

**Humanitarian demining is never done at night; it is done openly, and safety is emphasized over speed. Casualties are unacceptable within civilian demining whereas a certain amount of casualties, to achieve the military objective, may be considered acceptable, and thus, speed over safety may be emphasized in military demining.**

**Manual Demining Training and Management Can be Improved**

Our experience in Afghanistan shows that manual demining training can be improved by drill repetitions, which are taught until the deminer perfects every drill and each action becomes instinctive. It is very important to select several training areas that resemble actual mine fields being cleared. It is easy to practice clearance on a flat field with little vegetation, but demining is difficult when faced with steep slopes and dense vegetation—the sort of situation a deminer may face in a live mine field. Thus, to initially teach the drills and skills required, a flat area may be good, but this training must be followed up when the deminers have perfected the basic drills with training in difficult situations before they are put in a live mine field.

The use of practice mines with small pyrotechnic (flash/bang) simulation charges can bring realism to the training and demonstration drills and practices, driving home the point to the deminer that if he made such a mistake in an actual live mine field, he would be killed or seriously injured. Realism can be injected into training by mixing pieces of scrap metal in with the practice mines in the sort of density experienced in actual live mine fields.

Often, management can be improved by separating the operational side of the supervisory role from the administrative side, thus allowing the supervisor, his team and section managers to concentrate their time and efforts in the mine field. The administrative staff can concentrate its efforts into looking after the deminers' physical needs, personal problems and logistical requirements. If the deminer believes that these issues and his interests are being looked after by his organization, he is less likely to be distracted from his task or to make a mistake. Management should be rewarded for a job well done, but it should also be punished when a lack of supervision leads to a deminer getting away with poor drills and practices, which, in turn, leads to his death or injury. Managers must take a personal interest in the health and mental welfare of each of the deminers under his control. Each section leader should know intimately what motivates and makes each of his deminers "tick."
Differences in Military vs. Civilian Trained Deminers

The major difference between military and civilian trained deminers is that military trained deminers normally are instilled with a greater sense of personal self-discipline and are trained to undertake each action within the mine field as an instinctive drill. This practice may stifle free thought, but each drill has been carefully thought-out to give the deminer the greatest chance of coming out of the mine field each day in one piece. Many aspects of military demining differ greatly from humanitarian demining. Despite all these differences, the actual drills of humanitarian and military demining are the same.

Due to the tedious and repetitive nature of demining, there is a great temptation, especially among deminers who lack a strong sense of self-discipline, to cut corners and compromise the safety and quality of clearance. Most accidents happen when deminers do not follow the drills exactly. The safest personal policy is to follow the drills and procedures exactly the way they are taught in military fashion. This method, of course, is not the easiest way. Many deminers prefer to do prodding drills in the squatting position rather than the prone position (the style taught in the military). Squatting is less tiring and more comfortable, but the injuries are likely to be far less serious if the deminer is in the prone position, rather than the squatting position, when the mine explodes.

The situation in the squatting position, as much of the blast is channeled upwards when a mine explodes. Of course, this situation only applies to AP mines and not to the heavily charged AT mines. In two separate incidents in the same mine field within a period of two weeks, one deminer was killed and one slightly injured. Both accidentally initiated the same type of mine. The deminer who was killed was in the squatting position over the mine when it detonated. This deminer's protective visor was shattered by the blast, and a piece of his bayonet was imbedded in his head. The slightly injured deminer was in the prone position, prodding at arms length, and his visor stayed intact. The deminer suffered some wounds to his hand and some broken bones, but he lost no fingers and was actually able to walk back to the nearby camp.

Only military style discipline can get deminers to work as a team, to follow drills and not to try to find an easier (and less safe) way of undertaking clearance. Civilian-trained deminers often lack the self-discipline required to undertake the task methodically, thoroughly and safely.

Risks and Lessons Learned in Developing an Indigenous Demining Team

Established in 1989, as an indigenous leading mine clearance organization in Afghanistan, ATC has witnessed many developments each year. Many lessons were learned about setting up an indigenous program in 1989, when the first stages of developing a mine program for Afghanistan were put into place. Military trainers from nations such as Great Britain, Australia, Canada, America, New Zealand, Norway and other countries set up training grounds near Peshawar, Pakistan, in 1989, and trained the first few hundred deminers in what became known as "Operation Salah." The initial concept was to train Afghans to work as unpaid volunteers to demine areas around their villages. This concept had been used immediately after WWII by the Soviet Union and, at the time, was considered a continuing part of the "Great Patriotic War" fought against the Germans. It was believed that Afghan could similarly be persuaded that mine field clearance was a continuation of the fight against the Russian invaders.

Hundreds of Afghan volunteers were trained and paid for their training, but the scheme failed when the "volunteer deminers" were sent back to their villages. The idea of doing a dangerous job like demining with no medical or organizational backup, little equipment, no salary and no insurance coverage soon lost its appeal. It was not until a proper demining organization, the ATC, was set up with U.N. funding by Eblagh, an ex-Afghan Army Officer, that demining in Afghanistan took off. Eblagh set up an organization based broadly on military lines and ensured his deminers were paid a good salary, had a pension plan, were properly insured, instructed, supervised and had medical support in case of accidents.

Since 1989, the Afghan program has grown and now employs 4,700 personnel, of whom only 10 are expatriate staff. The expatriate staff's main role is to coordinate activities as a countrywide mine action plan and to address any technical issues and problems that may arise. In the past 11 years, over 200 sq. km of mine field and almost the same amount of battlefield have been cleared, and over 250,000 landmines and over 750,000 items of UXO have been destroyed almost entirely by Afghans. The United Nations set up a monitoring, evaluation and training NGO called META, staffed entirely by Afghans, to ensure that standards are kept high within the program. A small core of international staff will still be needed to act as a link between the United Nations and the Afghan government to ensure that Afghan NGOs within the program are not pressured by their government to undertake clearance tasks which may be of a military or commercial and not humanitarian nature.

Afghanistan is a good example that an indigenous program can work. Initially, it was believed in 1989, that it would take up to 1,000 years to clear Afghanistan of all land mines. Yet, in 10 years, over half of the high priority areas have been demined, and it is likely that, given a continuation of present funding and resources, all the high priority areas will be cleared by 2007. If funding is maintained at a high level after 2007, it is likely that the remaining low priority areas could be cleared within 20 years, leaving a mine-free Afghanistan by 2027.

Current Developments Within the Afghan Program

In a new development for the year 2000, ATC has received, as a donation, a UNO machine by the Japanese government to undertake mechanical demining trials. The UNO machine consists of a long reach mechanical excavator with the bucket replaced by a rotary cutting device. The rotary cutting device consists of a steel drum with hardened steel teeth designed to chew up the ground and any buried mines within the ground to a depth of 300mm. Further passes over the same piece of ground can increase the injury depth to 600mm, 900mm or 1.2m if required. Actual trials with this machine are expected to begin in Afghanistan in June 2000.

Other developments include an extensive testing program of new models of detectors from Mindala, Ebinger, Schiebel, Forsler, Mines and other companies in an attempt to find a replacement for the Schiebel AN 19/2 detectors currently in use. Extensive trials are also being undertaken on protective body armor and new visors separate from the heavy protective helmets currently worn. Also, replacements from the bayonets currently used by deminers to prod hard ground are being tested.

It is hoped that by the end of 2000, extensive trials will be undertaken on the Thiokol demining flares to burn out mines and the Pesco series of small shaped charges used in the oil industry (converting from 6.5g to 22g RDX) to destroy UXO.

As the Afghanistan population and countryside have been severely afflicted by the never-ending presence of mines, the presence of ATC reinforces the seemingly endless need for deminers to constantly clear land for civilian habitation. The need for improved PPE and machinery is evident, but with trained, motivated personnel, ATC is progressively moving toward its goal. With engineers actively pursuing innovative methods to increase the safety factor and clearance rate, ATC is on the cusp of a new horizon, combining military and humanitarian demining techniques to guarantee success in its mission to clear Afghanistan of its devastating mine crisis.

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