

# Journal of Conventional Weapons Destruction

---

Volume 15  
Issue 2 *The Journal of ERW and Mine Action*

Article 18

---

July 2011

## The Database of Demining Accidents: A Driving Force in HMA

Andy Smith  
*Humanitarian Mine Action Specialist*

Follow this and additional works at: <https://commons.lib.jmu.edu/cisr-journal>



Part of the [Other Public Affairs, Public Policy and Public Administration Commons](#), and the [Peace and Conflict Studies Commons](#)

---

### Recommended Citation

Smith, Andy (2011) "The Database of Demining Accidents: A Driving Force in HMA," *The Journal of ERW and Mine Action* : Vol. 15 : Iss. 2 , Article 18.

Available at: <https://commons.lib.jmu.edu/cisr-journal/vol15/iss2/18>

This Article is brought to you for free and open access by the Center for International Stabilization and Recovery at JMU Scholarly Commons. It has been accepted for inclusion in Journal of Conventional Weapons Destruction by an authorized editor of JMU Scholarly Commons. For more information, please contact [dc\\_admin@jmu.edu](mailto:dc_admin@jmu.edu).

# The Database of Demining Accidents: A Driving Force in HMA

This article evaluates the need for a centralized accident-report database within the field of humanitarian mine action. The author argues that the failure to report accidents by on-site personnel can inadvertently lead to otherwise avoidable accidents where similar events occur. The author highlights the benefits that the database has provided for the community and makes several recommendations on how to further reduce severe injury within the industry.

by Andy Smith [ AVS Mine Action Consultants ]

The Database of Demining Accidents (DDAS) was started in 1998 using public data gathered for the United States Army Communications-Electronics Command, Night Vision & Electronic Sensors Directorate. The database is an easy-to-use system containing the original demining accident reports with corresponding summaries.



During a rest break in Mozambique photographs are used to explain how devices function. All photos and graphics courtesy of the author.

## DDAS Influence on Humanitarian Mine Action

Having a collection of field reports about demining accidents and the context surrounding them has influenced the evolution of the International Mine Action Standards. Basing IMAS content on empirical evidence rather than received wisdom has enhanced United Nations Mine Action Service's field authority and contributed to its success.

During the drafting of IMAS 2001, the DDAS proved invaluable in settling disputes about basic demining safety considerations. In the absence of other data, the previous U.N. standards (1997) had been dominated by caution and were not well received in the field. With the database as evidence, the following was established:

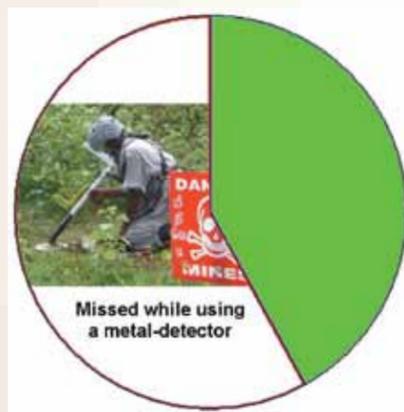


Figure 1: Analysis of the DDAS can highlight findings in equipment or training. Between 2005-10 58 percent of missing mine accidents were missed while using a metal-detector.

- The activities conducted when accidents occurred
- The explosive remnants of war most commonly involved in accidents
- The areas of the body most in need of protection
- The effectiveness of protection used
- The working methods most common around the world
- The limitations of commonly used metal-detectors
- The shortcomings of some mine-detection dog procedures and processes
- The minimum level of medical provision needed
- That mechanical demining was not the panacea it was claimed to be

At the time, received wisdom was that deminers lie down to excavate, should wear personal protective equipment with ballistic helmets and back-panels, and that the most common demining accident was stepping on a mine. Deminers' protective visors had to be 13-millimeters thick, and casualty evacuation by helicopter was required at all sites.

With the database as evidence, it was possible to show the following:

- In almost all cases, deminers did not lie down to excavate: they knelt or squatted.
- Anti-personnel blast mines were the most common device involved in accidents.
- Severe eye and hand/arm injuries were more common than severe leg injuries.
- Heavy PPE was rarely worn correctly.
- No commonly used PPE could provide appropriate protection against the close-quarter detonation of a fragmentation device.
- There was no reason to believe that a ballistic helmet or armor back-panel were necessary during demining tasks.
- High-tech blast boots were of no proven advantage and could give false confidence, while common footwear (not specially designed to prevent injuries) was equally effective/ineffective when stepping on the smallest mines.
- Safer working procedures were more likely to prevent severe injury than the use of more PPE.
- Traumatic injury was increasingly rare and could usually be stabilized in the field by appropriately trained and equipped paramedics.
- Shortcomings in management, leadership and training could be identified as a primary or contributory cause in many accidents.

Not all of these findings were universally accepted, but the evidence meant that they could not be ignored and a process of compromise within the IMAS Board membership could begin with the aim of achieving a pragmatic and practical consensus.

## Post-2001 IMAS Updates

The Database has provided evidence in support of several updates to the 2001 IMAS. These updates were all

related to field safety in one way or another. Below are several of the updates:

- The distinction between "working-distances" and "safety-distances" in IMAS 10.20 was supported by accident data analysis that showed that the minimum safety distances imposed for an AP blast-mine risk were frequently ignored and that secondary injuries only occurred when a second person was very close to the detonation. The required IMAS distance was actually a "safe distance" for a deliberate detonation (with a large safety margin) but was often impractical and unnecessary during field operations. A distinction between working-distances (when no deliberate detonations will occur) and safety distances (when deliberate detonations will be made) was introduced. This allowed more people to work simultaneously in many areas, thereby increasing efficiency. It may also have increased field safety by making supervision easier.
- The database was used to support the contention that the largest ERW in a minefield should not be presumed to be the greatest threat when determining working distances. It was decided that the greatest threat should be the largest device that could be detonated when using the predetermined procedures and tools. This meant that in mixed AP and anti-tank minefields, manual working distances could often be based on the AP threat. Evidence that visors were habitually not worn, or were worn incorrectly, led to the redrafting of IMAS 10.30 to allow other eye protection as a minimum. Five-millimeter polycarbonate goggles became the minimum requirement (subject to a risk assessment), although full-face visors remained the preferred option.
- The final wording of the new Land Release IMAS

The Database of Demining Accidents contains the original demining accident reports overlaid with a summary and easy-search facility. Always available on request, the database records were put online at <http://dda-online.com> in 2006. This site receives an average of 400 discrete visits a day, with the most popular topic being "Deminer training" ([http://ddasonline.com/suggested\\_training\\_usesDDAS.htm](http://ddasonline.com/suggested_training_usesDDAS.htm)).



The folding Minelab detector, an ergonomic success.

08.20, 08.21 and 08.22 were also informed by a close knowledge of the accident record.<sup>1</sup>

- The EOD-accident record informed the IMAS 09.30 Explosive Ordnance Disposal revisions.
- The IMAS Technical Notes 10.20-02/09 for Mine Action on Field Risk Assessment depends heavily on an intimate knowledge of the accident record and the factors that commonly contribute to accidents.<sup>2</sup>
- A significant number of accident reports include elements that show the investigators did not know (or had misunderstood) the IMAS requirements. This has supported arguments for simplifying the language and presentation of IMAS documents.

#### Research

The authority of the database as an objective record has been widely accepted. Evidence from the database is frequently cited in academic papers (Post-Conflict Reconstruction Master of Arts at York, U.K., and doctorate research at University of Genova, Italy, for example). The Massachusetts Institute of Technology runs doctorate research requiring students to study accidents from the database,<sup>3</sup> and other universities have asked for permission to link to the DDAS site. The Council for Scientific and Industrial Research, a government research institute in South Africa, has based several projects on the results of studying the DDAS. Between 2001 and 2010, technical inquiries to Noel Mulliner at UNMAS were frequently answered with reference to DDAS accident records.

The database cannot be used to prove much statistically because it does not include all accident records and relies on the honesty and sometimes questionable objectivity of the original accident investigators. However, the database allows qualitative assessments backed by quantitative analysis, together providing compelling evidence

of general conclusions that outweigh any individual's personal opinion. For an explanation of the quantitative and qualitative data analysis, see <http://ddasonline.com/observeinferDDAS.htm>.

#### Lessons Learned

In 2008, the author's DDAS analysis showed the following:

- Failings in management and supervision have increased over time.
- There has been an increase of expatriate field supervisors who had limited knowledge or appropriate experience regarding humanitarian demining. Some suffered accidents; others were a direct cause of them.<sup>4</sup>
- Many expatriates routinely applied double-standards and did not comply with their own rules: Their leadership abilities were put in question.<sup>5</sup>
- Severe hand/arm injuries became more common than severe eye injuries, albeit by a very small margin.
- Low-cost PPE6 was as effective as expensive PPE and often easier to use. Body protection (aprons) with a NATO STANAG V50 of 380 m/s was involved in more than 30 accidents and always provided effective protection, even when faced with boosted AP blast mines.
- Visors used in the field more than five years shattered in several accidents, implying that sun-hardening was a problem (this led to UNMAS Technical Note 10.10/02 for Mine Action addressing the subject).<sup>7</sup>
- Wearing a full-face visor did not reduce the incidence of severe eye injury.
- The need for dedicated on-site, ambulance vehicles was reinforced when an accident occurred in which the only vehicle, plus the only radio, were destroyed in an accident at a remote minefield. Several fatalities resulted.
- Common training needs of deminers and medical staff were identified.

Some of these conclusions were difficult for IMAS Board Members or field practitioners to accept, but unexpectedly, more accident data was informally supplied than at any time before.

#### Data Gathering and Security

Responsible field staff provide accident records because they understand that sharing this information might prevent the unnecessary repetition of avoidable

accidents. UNMAS has supplied a few accident records, but no one has conducted a comprehensive data-gathering exercise, thus leaving the DDAS as the only record of accidents in the industry. The value of a good accident archive is recognized in all hazardous professions except, it seems, mine action.

The current number of recorded victims in the DDAS is close to 1,000. This includes all the records for some countries in some periods, which has allowed an assessment of the data-spread to conclude that the records are broadly representative of all injurious humanitarian-demining accidents.

Despite the current IMAS requirement for demining groups to share accident data, many do not. Accident secrecy has been a constant problem, arising sometimes out of loyalty to colleagues and sometimes because the investigators want to protect the victim's insurance payout. It is hard to criticize demining groups when the United Nations Development Programme, United Nations Office of Project Services and UNMAS are also reluctant to share any possibly embarrassing data. Because the names of the victims, investigators or demining groups are not published, however, there is no real reason to fear sharing accident details and the lessons that can be learned from them.

The database has been in the public domain for 12 years, and the media or competing demining organizations have not abused it, implying that the removal of names and identifiers before publication has been successful in preventing abuse.



Figure 2. Blast resistant long-handled tools have been proven to reduce the risk of severe hand injury.

#### Future Uses

The weight of evidence within the database changes as new records are added. Currently, database evidence could be used to improve the safety of deminers in several ways:

- The use of purpose-designed blast-resistant hand tools can save fingers and hands. This has been known for more than a decade but overlooked by managers, conscious of insufficient resources, who instead provide cheaper alternatives such as gardening tools that put the user's hand on top of the blast, then shower the deminer with fragments as the tool breaks up. Compelling evidence exists for the use of purpose-designed, blast-resistant hand tools to be made a requirement (instead of a recommendation) in IMAS 10.30.
- Using a pickaxe has been common in some countries for at least 15 years. Clearing mines with a pickaxe sounds bizarre, but when starting an excavation in compacted or rocky ground, other tools can be ineffective and frustratingly slow. Banning the use of the pickaxe has been tried—and widely ignored. Engineers at MIT have designed an alternative tool that can do the same job as a pickaxe with reduced risk. The tool is far easier to guide the tip to the intended spot, requires less energy to use and reduces risk if detonation occurs. A field trial of this MIT device in Sri Lanka during 2006 was a success. Most people, however, have never heard of this tool, and it has not been widely used. The existence of a pickaxe alternative, designed to stay intact and protect the user's hands, should be publicized along with examples of accidents in which pickaxes were used.
- Manual deminers using metal detectors provide an archetypal image of the working deminer. While some deminers are skilled with metal detectors, evidence indicates that many deminers and their trainers do not understand the limitations of these tools, and they do not know how to use metal detectors with confidence and competence. For example, accidents have occurred when a detector is wrongly adjusted and is unable to detect the targets. Inadequate detector training has also led to inaccurate pinpointing and excavations starting on top of the mine. The accident record contains abundant evidence supporting the need to improve metal-detector training at all mine-action levels.

- Among the records, frequent evidence shows that the appointment of international staff with inadequate knowledge of the IMAS or demining (despite high-level academic or military qualifications) can lead to increased risk for working deminers. In the field, experience and a commitment to learning from others are more valuable qualifications than academic or military achievement. This could be stressed in the IMAS and put into practice by the U.N. agencies and various demining organizations.
- From the earliest records to the present day, there are examples of new commercial organizations having accidents that repeat the obvious errors of previous accidents (recently, this has been especially obvious in Afghanistan). This implies that contract conditions need revising so that the deminer's safety shares the same priority as cost and which require a knowledge of the history of demining (including any accidents) where the contract is awarded.
- The insurance provision for local deminers injured at work throughout humanitarian mine action is varied but always far less than an expatriate would expect. Generally, national deminers receive medical care and a single payment considered derisory in a Western environment. Despite some informal attempts to provide long-term support, there are no formal provisions for severely disabled deminers to receive a disability allowance or even long-term prosthetics and therapy assistance. Among the records, some evidence indicates that accident victims have been abandoned and have died in extreme poverty or committed suicide. Those in dire circumstances can only be inferred because no comprehensive follow-up has been conducted. Improved provision for demining accident victims should be addressed.

#### Summary and Recommendations

The DDAS has been of proven value to the humanitarian mine-action industry. It has been "a driving force" in promoting practical change and the sharing of experience, in creating and updating the IMAS and in the field. An anonymous database, it protects the privacy of those involved in accidents while allowing others to learn from their experience.

As an industry, international mine action has not matured to the point where it is open and transparent about its accidents. Some individuals and groups at all levels

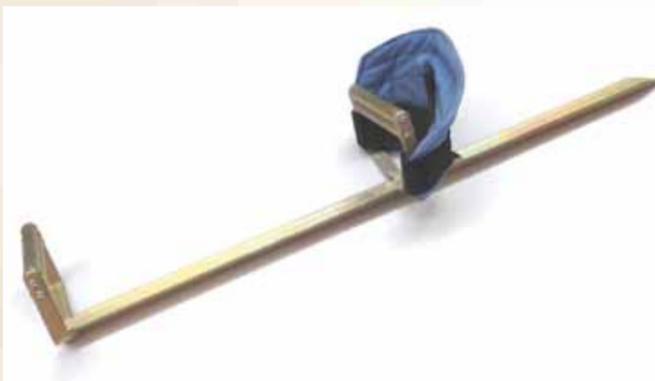


Figure 3. A two-handed excavator designed at MIT to replace the pick-axe. The author believes that if the Afghans alone were to adopt this tool, it would save at least a dozen hands a year.

withhold or conceal information that could prevent future accidents. When organizations do not disclose accident data, the managers run the risk of appearing criminally negligent by ignoring their responsibility for the safety and occupational health of their staff.

Deminers are the agents of those who fund humanitarian mine action. They work to priorities that the donors have imposed, yet their treatment after an accident usually lacks any sign of the humanitarian concern that lay behind their employment. It is remarkable that a "humanitarian" industry has made no real effort to make long-term provision for them—despite interest shown in international forums by expatriate field practitioners who are concerned for their colleagues regardless of their nationality.

It is time for a U.N. agency to take the DDAS under its management, enforce the IMAS requirement for the sharing of accident records, and maintain the principles of anonymity and of keeping original accident reports on which the DDAS was founded. This would be a requirement in any responsibly controlled industry and is a glaring omission in humanitarian mine action. A U.N. agency should accept responsibility for gathering accident records, creating an archive and conducting informed analysis of that archive.

Earlier this year UNMAS asked the Geneva International Centre for Humanitarian Demining to gather accident data in a new system extending the "tick-box" accident records recorded in the Information Management System for Mine Action. Unfortunately, this would effectively mean creating a new database (instead of updating the existing DDAS), and would require ignoring

the detailed reports that provide the core of the DDAS. Without the original accident report to which to refer, analysis will rely on a brief summary made by an office-based staff member. This initiative may succeed, but the result will be "shallow" because it will depend entirely on the many levels of interpretation between the accident event and the "tick" placed in an available box on a form.

In the meantime, the DDAS is currently being updated. Demining accident records, questions and comments should be sent to the author at [avs@nolandmines.com](mailto:avs@nolandmines.com). 

See endnotes page 81

*The originator and keeper of the Database of Demining Accidents, which is online at <http://ddasonline.com>, wrote this article.*



The longest serving member of the IMAS board, Andy Smith has worked in humanitarian mine action since 1995. Demining jobs have included mine clearance, surveying, nongovernmental organization management and United Nations Development Programme country program management. Not-for-profit research and development work has included developing safety equipment for use in HMA. Examples include the most commonly used blast visor and blast-resistant hand tools. Consultancy work has included working for the U.S. government, U.N. agencies, NGOs, universities, private companies and the Geneva International Centre for Humanitarian Demining.

Andrew Vian Smith  
AVS Mine Action Consultants  
14 Old Dixton Road  
Monmouth / U.K.  
Tel: +44 (0) 16 0071 9993  
E-mail: [avs@nolandmines.com](mailto:avs@nolandmines.com)  
Website: <http://nolandmines.com>;  
<http://www.ddasonline.com>

## News Brief

### Conveying Lebanon's Cluster Bomb Issue through Film

Death in the Fields is an animated documentary that focuses on the cluster bomb crisis in southern Lebanon. The millions of unexploded bomblets scattered across the country's south are the ill-fated result of a 2006 Israeli offensive against Hezbollah in Lebanon. Today, in addition to killing and maiming indiscriminately, these weapons continue to contaminate lands where children once played and make agricultural land unavailable to farmers.

Throughout the film's concise run time of just over 11 minutes, editorial cartoonist Patrick Chapette manages to convey the dread of these horrific weapons in a unique fashion. His black-and-white illustrations are surprisingly lively while alluding to the starkness of the issue. When these illustrations mix with real-life photographs, statistics and stories, they pack a serious punch. The film premiered at the *Visions du Réel* film festival in Nyon, Switzerland on 8 April 2011 and is currently available on the International Committee for the Red Cross's website: <http://bit.ly/j6pjlo>. 

~Dan Baker, CISR Staff

