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Andy Smith

*Humanitarian Mine Action Specialist*

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What Use is a Database of Demining Accidents?

The author has maintained a database of demining accidents for four years. It contains records of many of the explosive accidents that deminers suffer while going about their work. This article explains the uses and limitations of the database and the software developed to contain it.

by Andy Smith, AVS Mine Action Consultants

I first published a database of accidents in humanitarian demining (HD) in 1998. In my experience, it was unique because it attempted to contain the source material as well as the conventional "spread-sheet" style summaries that characterize most databases. There have been several releases on CD since 1998, and the latest was recently completed with backing from the Geneva International Centre for Humanitarian Demining (GICHD). It was originally called the "Database of Demining Incident Victims" (DDIV). At GICHD's request, the latest version has been renamed the "Database of Demining Accidents" (DDAS).

Original accident reports (edited for anonymity) are included when possible. These may include photographs and usually include some medical details about the victim's injuries and treatment. The 1999 edition of the DDIV contained details of 319 victims. The current release contains an additional 160 but also many extensions to old entries, such as medical reports and interviews concerning the ongoing situation of victims. Some of the additional data records accidents that happened some time ago. For example, there is now some data about accidents in the British sector of Kuwait after the Gulf War (some for other sectors).

Principal Uses

It has been argued that the database provides a stick with which to beat the HD industry. While it could not be used to target an individual or demining group, it could be used to criticize, but only if you subscribe to the belief that people only learn through pain. It is perfectly possible to use the lessons that can be derived in a positive way, as described below.

Research

By providing "snapshot" of activities surrounding accidents, the database can be used as an introduction to how demining is actually carried out. This is often in variance with published standard operating procedures (SOPs), and recent reports are frequently very well detailed. Researchers developing new equipment have used it, and I recommend its use when preparing Technical Advisors (TAs) for field deployment. This might be especially useful when a TA has experience in one area and is being sent to another.

Apart from my own research, reports based on the database have been presented by Colonel Alixair MacAulay (ex-GICHD, now Director, Cranfield Mine Action) and De Vernon Joynt (ex-MECHEM, now CSIR in South Africa).

Training Aid

As a training aid, real events can be used to show the importance of a whole range of demining rules. These include setting up marker, appropriate tools and detectors, cautious excavation, Quality Control checks, blast visors, etc. It also provides salutary lessons on the need for good training, appropriate field control, open management, appropriate medical and communications equipment, etc. With real examples, these issues come to resemble a "matter of opinion."

Several demining non-governmental organizations (NGOs) have asked for the medical details in the database for use when training their field medics.

Reference

The database proved invaluable during the revision of some parts of the International Mine Action Standards (IMAS) because the range of opinion was very broad and based on heartfelt individual experience. The ability to refer to a broad overview derived from global experience was useful, especially when the protagonists held positions of authority and had made previous decisions based on incomplete knowledge.

In this context, reference to the database established the prevalence of severe hand injury and showed which mines and demining activities posed the greatest threat. It also showed that over-protection with ineffective personal protective equipment (PPE) is a not desirable nor necessary.

Desmystifying

Demining engenders myths of danger, illusion and the "black art." The database explodes many of the myths—and shows how simple demining actually is. It also shows how multilayered management remote from the actual work can introduce new dangers by ignoring their imposition. The most obvious myth is that the database exposes is that deminers lie prone when excavating mines. Even in the few places where the SOPs demand it, lying prone is so rare that it is certainly the exception rather than the rule.

Identifying Causes

Perhaps most significant, the evidence clearly indicates that deminer error is an infrequent cause of an accident and that failures in the control chain are far more common. When seeking to reduce the number of accidents and/or the severity of resulting injury, understanding why accidents occur is essential. When the process of studying the database is a contributory cause, that can be a deeply uncomfortable lesson.

Archive

It is never possible to know what information will be needed in the future. The database provides an archive to ensure that data is preserved. With the closure of the Kosovo Mine Action Coordination Centre (MACC), the lessons derived from their accident investigations would have been very hard to access if they were not included in the DDAS. Also, a disaster of accidents in Mozambique was recently returned to the Mine Action Centre (MAC) in Mozambique, where the original records had been lost. And in Cambodia, most of the records that have survived are held in Khmer, so the DDAS provides an English language translation for those wanting to learn from past accidents.

The database is a useful source of information for managers and a very relevant training tool for field use. Examples can be found to support safety requirements that deminers may think unnecessary, and the reports themselves can be used to promote best practice in accident investigations. The standard of investigation varies as much as the experience of those carrying them out, and frequently, an opportunity to learn from mistakes can be obscured or lost in the reporting procedure.

Acceptance and Rejection

While demining NGOs such as Mines Advisory Group (MAG) and People Against Landmines (PAML) requested copies very early on and have issued the database to field groups as a resource, other equally famous groups have failed to cooperate with data acquisition and refused to accept the most compelling inferences that can be drawn from the data amassed about their own accidents. Because some players in the industry have been less than honest in their reporting and less than open in sharing their experience, the database has been presented as "complete." I think that there are about 65 percent of the accidents since 1996 in the database, but I cannot be sure. With records of close to 500 victims, it includes complete data for some countries in some years; Mozambique, Kosovo, Bosnia, Angola, Cambodia and Afghanistan are examples. The data made available for Kurdish Iraq is sporadic and censored by the United Nations Mine Action Service (UNMAS) before being supplied. Data from the Kuwait clean-up after the Gulf War is only just becoming available so the database sometimes stoches back in time. Interestingly, the patterns that emerge in countries where all data is available do not differ significantly from patterns based on reports that are available for these countries. It seems that the inferences can be generally applied. Certainly, until a more complete database is compiled, there is no reason not to use the best evidence we have while working to extend it. In some cases, commercial and political interests have led to data being withheld. To cite a commercial example, it took me more than four years to get copies of the written reports surrounding accidents during the trials of a mechanical demining system in Mozambique. Those records include well-detailed charts of the staggering percentage of mines that were not detonated and were left damaged by the machines, which may explain the protracted secrecy.

An example of "political" interests leading to secrecy is the fatal accident involving a roller system mounted on a tank outside Kabul in the early 1990s. I presume that it is feared that their own mistakes are being made public that has led the UK office of the famous NGO involved to be uncooperative. They began by insisting that they did not keep records of accidents. In 1997, they corrected this and said that all their accident records...
were hard to find. Two years later, they promised that data on all their accidents would be provided if I gave them the details about which of their accidents I already knew about. I did that, but after a further 18 months they have failed to provide access to records of a single accident. Fortunately, the field officer of that particular NGO is less fearful of the truth and (outside Afghanistan) have always provided all the records in their possession when I have gone to knock on their doors.

It is only fair to contrast the failures with the successes. Some MACs and NGOs have made their incident investigations readily available. The Kosovo MACC was especially helpful. It made the most thorough investigations of any record, provided them quickly and then carried out follow-up inquiries about the health of the victims.

So, if the DDAS is less than perfect because it does not contain all of the records it could, that problem will only be addressed when some major players in the industry smarter up their act.

New Data, New Conclusions?


The increased number of database entries have very little effect on my previous conclusions. But the incompleteness of the data means that any analytical study based on it must always be made with informed caution.

Additional records change the ratio between USO and mine accident in HD significantly. But that ratio was never representative because traditional explosive ordnance disposal (EOD) data are often carried out by serving military who do not carry out independent investigations and do not make their own accident records at work.

The rich data stream from the Balkans has changed the balance of "droit" mines in HD, but not significantly. Defining the "droit" mines as those most frequently involved in accidents, the current list (April 2002) reads:

Demining accidents in the DDAS
AP blast 74.4%
AP/B/frag 8%
Fuzes 5%
AP/B/frag 7%
AT 3%
Ordnance 3%
Submunition 1%
Other/unknown 3% 74.4% 8%

This is interesting, but not much help unless you put it alongside the results of those accidents. For example, the mines/devices involved in accidents where deaths occurred were:

Deaths in demining accidents
AP blast 22%
AP/B/frag 33%
Fuzes 9%
AP frag 3%
AT 8%
Ordnance 18%
Subminition 1%
Other/unknown 12%

The AP blast and AP bounding-fragmentation mine accidents in the Balkans with a mine involved is not a problem in most of the rest of the world (the PROM-1). Also, most of the AP blast mine incidents involve the PMN, which does not occur at all in recorded accidents in the Balkans. It should also be noted that the majority of the ordnance deaths occurred in Kuwait during the post-Gulf War clean up and before any international safety standards for HD existed.

In an explosion accident, the two most common severe injuries are to the eyes and the hands/arms. The injuries may be the loss of an eye, a finger, a hand or an arm—or may be the loss of function in an eye, finger, hand or arm—leading to permanent disability.

Common injuries when exploding AP blast mines

(1) Loss of eye or eyes 6.7%
(2) Amputations of fingers 12.5%
(3) Amputations of arms 2.3%
(4) Amputations of hands 12.5%
(5) Amputations of hands, arms and fingers 2.3%

Hand injury also results from digging incanently or from devices that are particularly sensitive if the device is an AP blast mine, however, the detonation does not generally cause severe injury unless one or more of the above are also true. So perhaps you will understand why my own particular technology interests in demining have been visors, handtools, appropriate PPE and training. The database has helped me to identify the problems and sometimes to begin to answer them.

The Future of the Accident Database

Until recently, the CD database was supported by any organisation or donor. My last update of the database was funded through GICHD with UNMAS approval. It is available on request from GICHD in a self-installing CD for use on comput­ers with Windows 95 (or later) and Office 97 Professional (or later). Please contact Paul Ellis at GICHD (p.ellis@gichd.org) if you would like a copy.

I believe that it should be extended with another dataset listing mine accident incidents where the device was "found" after finalization was cleared. These events are often investigated, but the reports are often jealously guarded. Such a database would allow some objective com­parisons of the effectiveness of methods (and groups). The database could also be extended to include datasets of civil injuries in uncleared areas—and you will find an example of this on the distribution CD.

But, at the time of writing, the future of the database is uncertain. The database may be taken over by UNMAS/ GICHD who would then manage its maintenance and release. This should mean that access to some data will be easier, but experience has shown me that only the groups with the authority to oblige reluctant demining groups and NGOs to allow access to this data are their funders. We hope they can also be persuaded to cooperate.

If UNMAS does take over the database, I will retain at least one further independent update.

Meaning, if you want to know how to release your data, I will release the database.

Notes

To preserve the anonymity associated with the database, I cannot name the many people who have helped me in this task over the years. However, the management of a few demining organisations have been especially forthright and I do not think they would be offended by a public acknowledgement of their organisational history. These are: Mine Action Group (MAG UK), the Konno MAC, UNMACs/MAG (now UNMACs/Demining Group (EOD)), Angolan National Institute for the Re­moval of Explosive Ordnance (INAM), Norwegian Peoples Aid (NPA). Many individuals working for other organisations have been a great help. They know who they are, and some are acknowledged in the database introduction. Thanks.

Biography

Andy Smith has been a hands-on demining practitioner for the past eight years. He has worked here taken him into hundreds of mined areas in Angola, Mozambique, Cambodia, Afghanistan and Afghanistan—in the Kosovo, Somalia and Brazil. He has devised and implemented safety equipment and procedures in several, developed new equipment and oversaw its technology transfer to developing countries, and been employed as a "sub­ject matter specialist" by research programmes, Univer­sities and many of the major players in HD. Recent work has included producing country-specific training materials for deminers, surveyors and the public.

The part of the work he has taken most interest is the Database of Demining Accidents, which may have been back in 1999. This paper was an attempt to answer the question: "What use does the database serve?"

All previous names of the authors

Contact Information

Andy Smith
Tel: +44 (0)1600 713727
Fax: +44 (0)1600 719993
E-mail: avs@landmines.demon.co.uk