

MINE ACTION - THE MANAGEMENT OF RISK

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1. INTRODUCTION

The examination of “Standards and Measures of Success” at the recent Humanitarian Demining Conference, hosted by James Madison University (JMU) demonstrated that there must be fundamental changes in the approach to Mine Action if the global influence of land mines is to be successfully challenged. In addressing the need to measure the effectiveness of Mine Action we are acknowledging that the current situation is untenable, particularly if we are to get anywhere near the eradication of the problem by 2010.

While most agree that deadline is unattainable it does help focus our efforts on improving the rate and cost effectiveness of Mine Action, particularly the mine clearance element. However even if the levels of increased funding currently promised are achieved and with even the most promising detection technology a long way off, as the Second International Conference on the Detection of Abandoned Land Mines showed, our resources are totally inadequate in comparison with the scale of the problem, if clearance methods and rates remain unchanged.

This paper will advance the view that the key to achieving the breakthrough lies in a risk management process with a more realistic, some might say, pragmatic, approach to mine clearance using existing resources and technology. In doing so we must challenge our existing preconceptions about what is both possible and desirable and call into question some of the myths which are currently viewed as fact by the decision makers at all levels of Mine Action.

2. MYTH OR FACT?

The JMU Conference consensus was that many of the existing International Standards for Mine Clearance are poorly conceived, unrealistic, unattainable, and not measurable; more often than not, observed only in the breach. The proposed UN Mine Action Service (UNMAS) review will, hopefully, arrive at more realistic and enforceable standards and, as importantly, look at ways of more uniformly implementing them. Areas of particular concern are clearance depths, personal protection equipment, the use of mechanical equipment and the “dreaded” 99.6% clearance standard. The assessment of clearance standards is one of the greatest myths associated with mine clearance. The term >mine clearance = itself engenders a belief that the process does, and must, result in areas being totally cleared of mines. The reality is of course, that, although we strive for 100% clearance, we rarely achieve that level because of the combination of a number of factors that impinge on and degrade the process but are beyond the scope of this paper.

In some ways the professional mine clearance community has abrogated its responsibilities in this area. By allowing the 99.6% figure, which was not based on any proper analysis of what is currently achievable or being achieved, to be set in stone, we have allowed donors and end users to continue to believe that the standard is always being achieved and that anything less is unacceptable.

It is also conventional wisdom that such high clearance standards can only be achieved by conventional manual clearance and that other detection and clearance methods, particularly mechanical clearance, can not achieve the required standards. Figures for mechanical clearance quote clearance levels of only at 75-90% (depending on who has provided the analysis, where, against what system and what agenda they were working to). Just as the 99.6% figure was

“plucked from the air” so are these figures, based as they often are on results achieved by inappropriate equipment, used in inappropriate ways and in inappropriate conditions.

Even if we accept these disparities on face value the use of mechanical methods has the potential to so increase our clearance rates that we must reconsider their utility overcoming any shortcomings through better management, better selection of equipment against the requirement, the use of multiple passes or multiple equipment and the better management of the residual risk of this and, indeed, any clearance programme.

The mine clearance process does not eliminate the mine threat. It is a risk management tool that reduces the risk from mines to acceptable levels. What are those acceptable levels, how are they measured and how do we manage that risk?

3. WHAT IS RISK MANAGEMENT?

Risk management is the process of identifying, assessing and addressing risks allowing operational decisions to be made that balance risk costs against benefits. Risk compares the probability of an event occurring and the severity of the outcome if it happens. Risk management will aim to reduce one or both of these factors to levels at which their effect can be discounted, accepted or mitigated through other precautions.

This process can be summarised by a risk assessment matrix such as that shown in figure 1 below.

		Likelihood of Mine Incident				
		Recurrent	Likely	Occasional	Seldom	Unlikely
Single Incident		<i>Very Frequent</i>	<i>Frequent</i>	<i>Several Instances</i>	<i>Will occur</i>	<i>Possible</i>
Multiple Incident		<i>Frequent</i>	<i>Several Instances</i>	<i>Will occur</i>	<i>Possible</i>	<i>Assume it will not occur</i>
	FATAL death or total loss of equipment	Extremely High	Extremely High	High	High	Medium
	CRITICAL severe injury or damage to equipment	Extremely High	High	High	Medium	Low
	MARGINAL minor injury or damage to equipment	High	Medium	Medium	Low	Low
	MINIMAL no injury or damage to equipment	Medium	Low	Low	Low	Low

Figure 1 - Risk Assessment Matrix

Mine Action aims to reduce the impact of mines on the social and economic well-being of the affected country. If we reduce the level of risk, by reducing but not, necessarily, eliminating all mines, so that it falls within the last two columns of the above matrix, we now have a manageable residual risk. This can really only be achieved by reducing the numbers of mines present or by preventing the exposure of individuals to mined areas by controls or education. The severity of a mine incident is largely governed by the design of the mine, we can only mitigate its effects by providing enhanced medical support and other victim support measures. For mine clearance operators, however, good procedures, protective equipment and the use of mechanical clearance

or stand-off detection can influence both dimensions.

Each function of Mine Action and each process within those functions should include risk assessment and its own risk management process. Risk management is continuous, subject to review and alteration as the situation changes, more information becomes available and lessons are learnt. This concept is summarised in the table at Figure 2 below.

		Phases of Risk Management						
		Phase 1 Identify Hazards	Phase 2 Assess Hazards	Phase 3 Develop Controls & Make Risk Decisions	Phase 4 Implement Controls	Phase 5 Supervise and Evaluate	Phase 6 Manage Residual Risk	
Mine Action Processes	National Recovery Plan			X			X	
	Mines Awareness - pre Mine Action			X	X			
	Level 1 Survey	X	X					
	Mine Action Plan		X	X	X	X	X	
	Level 2 Survey	X	X					
	Level 3 Survey	X	X					
	Mines Awareness - during Mine Action	X		X	X		X	
	Mine Clearance Programmes	Reconnaissance	X	X				
		Planning		X	X			
		SOP Preparation			X	X		
		Training			X			
		Clearance / Disposal	X	X	X	X	X	
		Quality Auditing	X	X	X	X	X	
Mines Awareness - post Mine Action	X		X	X		X		
Victim Support				X	X	X		

Figure 2 - Overview of the Risk Management Process for Mine Action

In terms of mine action the risk management process can be considered in six phases.

- Phase 1 Identify the quantity, nature and extent of the mine hazard.
- Phase 2 Assess the impact of the mine hazard in order to take timely, efficient and effective measures against it.
- Phase 3 Develop a mine action programme which, in line with the national recovery plan, puts in place appropriate plans and decisions to address the risk and balance it against humanitarian, political, economic and environmental costs.

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|---------|---|
| Phase 4 | Implement the mine action plan. |
| Phase 5 | Evaluate all elements of the mine action plan including measures of effectiveness and lessons learnt. |
| Phase 6 | Assess and manage the residual risk against acceptable criteria. |

4. THE RESIDUAL RISK

In Humanitarian Mine Action what is the acceptable residual risk? The current mind set, particularly among donors, end users and non-mine clearance NGOs, is that the level is zero. Morally and emotionally this is understandable but is unsustainable in practical terms.

Even if we achieve 99.6%, and many programmes do not, there is already residual risk. But do we have the safeguards to manage that risk? We generally do not, because we allow end users to persist in the misconception that the problem has been eliminated and we are afraid to acknowledge that it has not. The mitigating measures to further reduce the risk, such as post-clearance mine awareness, are currently rarely provided. In Western Europe the residual risk from both mines and unexploded ordnance originating from World Wars I and II persists today. The reality is that mine affected countries will always remain mine affected and must learn to live with that legacy. In the above table it should be noted that the author believes there should be, three phases of Mines Awareness training before, during and, most particularly after mine clearance in order to address the residual risk from the process.

Eventually a cost and risk analysis must be made that results in practical levels of mine action, completed in as short a time as possible and that results in manageable, but not zero, residual risk. In order to illustrate this concept look at the cost and risk analysis model below.

5. COST AND RISK ANALYSIS MODEL

This is a fictitious case, but which is based on sustainable representative figures. It compares the performance of a totally manual programme against a mainly mechanical programme. It does not enumerate mitigating factors such as mine awareness training and, for ease, assumes linear progression of statistics. Within these shortcomings it illustrates effectively the major impact that mechanical clearance can make. This is summarised in the table below.

It considers a mine-affected area of some 1,200 square kilometres in which one casualty is being taken for every 10 square kilometres each year. A typical manual clearance programme could clear 100 square kilometres each year at a cost of US \$5 million a year. Casualties from within the programme are taken as one a year and the national clearance standard is 99.6%. Over eight years following the completion of the task a further five casualties can be expected from the 0.4% of mines that remain, representing the residual risk.

Taking the same base figures for a mechanical clearance programme it assumes that mechanical systems can clear at three times the manual rate and at half the unit cost. These are conservative when taken against claims from some mechanical projects of 6-10 times the manual rate at a quarter of the unit cost. A lower figure has been taken to allow for a multiple pass or multiple machine operation supported by conventional quality control using dogs and/or manual teams to

give a clearance standard of a nominal 95%.

Over a twenty year period from the start of the programme the manual clearance will take 12 years to complete at a cost of US \$60 Million. Casualties from mine affected areas, among mine clearers and those from the residual risk would be almost 800. In contrast the mechanical programme would be completed in four years at half the cost and with half the number of casualties over the same twenty year period, even accepting the higher level of residual risk.

Year	Manual Clearance				Mechanical Clearance			
	Clearance Rate per year	Cost of Clearance \$5 per sq metre	Casualty Rate mine affected areas	Casualty Rate within Program	Clearance Rate per year	Cost of Clearance \$2.5 per Sq km	Casualty Rate mine affected areas	Casualty Rate within Program
Year 0			120				120	
Year 1	100	5 M	110	1	300	7.5 M	90	1
Year 2	100	5 M	100	1	300	7.5 M	60	1
Year 3	100	5 M	90	1	300	7.5 M	30	1
Year 4	100	5 M	80	1	300	7.5 M	0	1
Year 5	100	5 M	70	1				
Year 6	100	5 M	60	1				
Year 7	100	5 M	50	1				
Year 8	100	5 M	40	1				
Year 9	100	5 M	30	1				
Year 10	100	5 M	20	1				
Year 11	100	5 M	10	1				
Year 12	100	5 M		1				
Totals	1,200	60 M	780	12	1,200	30 M	300	4
Casualty Rate from Residual Mines after 20 years				5	Casualty Rate from Residual Mines after 20 years			96
Total Casualties				796	Total Casualties			400

Figure 3 - Cost/Risk Analysis Manual vs Mechanical Mine Clearance

This simplified cost and risk analysis does not include consideration of the accelerated socio-economic benefits obtained by completing the programme so much earlier. It does, however, highlight the fact that the residual risk between 99.6% and 95% is manageable and identifiable.

Risk management would allow procedures to be used that would mitigate and hence reduce these casualty figures.

6. CONCLUSION

If Mine Action is to accelerate to the necessary levels to meet, or at least approach, the 2010 deadline then fundamental changes to the perceptions and approach of donors, end users and the

mine action community are necessary. We are promised increased funding but unless our philosophy and techniques change this will be insufficient. Technology improvements are incremental and slow in coming.

The key is proper Risk Analysis and Management to make informed decisions on what can be achieved with existing techniques. We have to accept that risks cannot be eliminated, however much we think they can, but manageable residual risk can be achieved by the increased use of mechanical equipment. This will allow more cost effective and timely achievement of the global mine action plan.