MANAGEMENT OF RESIDUAL ERW (MORE) FROM MICRO AND MACRO POINT OF VIEW – ANGOLA CASE STUDY

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INTRODUCTION

Management of Residual ERW (MORE) refers to the comprehensive approach to dealing with the risks posed by explosive remnants of war (ERW). The approach is long-term; dealing with ERW and mine contamination even long after general proactive clearance operations have ceased and a country has complied with its international treaty obligations.

Angola has gone through several armed struggles over the last forty years, with a liberation movement against Portuguese in 60s, through several stages of civil war in 80s, 90s and 2000s. Today, Angola is peaceful country with great prospects, but the legacy of four decades of war is still visible with every step.

According to the Mine Action Monitor, the Republic of Angola has almost 129km2 of confirmed hazardous areas (CHAs) containing mines and a further 356km2 of suspected hazardous area (SHA). It also has a significant problem with unexploded ordnance (UXO).
MACRO POINT OF VIEW

The typology of a MORE system is different than a standard mine-action approach, though many of the same considerations are present in both. For this article, MORE will be discussed in terms:

1. Risk Management
2. Long Term Solutions,
3. Varied Actors.

Risk is generally understood as “the effect of uncertainty on objectives,” but here is directly linked to those risks arising from or related to ERW.
RISK MANAGEMENT

Risk Management consists of a coordinated set of activities to direct and control a project, organisation, programme or national system with regard to risk.

ERW risks actually exist only when three associated factors combine: ERW contamination must be present at a location where activity (capable of interacting with the contamination) is taking place, or will take place.

In the MORE risk diagram (right) a real risk only arises in the central red zone of the diagram. All three contributing factors need to be understood when identifying MORE risks.

Perception of risk may extend well outside the red zone. Mechanisms for addressing the different areas of perceived and potential risk are discussed below.
LONG TERM SOLUTIONS AND THE IMPORTANCE OF INFORMATION MANAGEMENT

Using MORE as a system is most beneficial when looking at extended time horizons. It is only over the protracted time-scale of ERW response that a cyclical approach makes sense; otherwise simpler project implementation plan would be used.

Even after comprehensive clearance efforts, contamination has been shown to remain an ongoing problem even seventy years (Second World War) or one-hundred years (First World War) after a conflict ends. It is therefore important to keep the long term nature of the problem in mind, and ensure national policies support sustainable practice.
On this specific project, National Oil Company of Angola, conducted preliminary studies of a geological structure located to the south of the Kwanza (Onshore), in order to determine the oil potential in that field. The studies are initially based on a seismic survey of the region. Company has a task to enable safety of all personnel related to ERW. Maavarim Group has opened about 1,600 km' seismic lines in varied terrain (from savannah to dense vegetation and jungles) through highly cliffs, deep ravines and many rivers.

Maavarim Group concluded that the management of residual ERW approach was a best-fit on this kind of project. This was due to several reasons:

- Different risk on different part of the project
- SHA/CHA existing on some part of the project
- Client awareness about ERW problem, but lack of technical knowledge
- Best cost/benefit result
In this case the process of risk management was conducted in line with guidance described under MORE, going through all the elements of the risk management cycle. Here, though, the focus is just on a more specific set of locations, risks and inputs.

1. Understanding the MORE context
   - Legal and regulatory aspects
   - Financial and Economic aspects
   - Information aspects
   - Capacities and capabilities
II. IDENTIFYING ERW RISKS

The risks posed by ERW in Angola are quite significant, meaning that it is very hard to determine all risks on the project from the early beginning. Applying NTS from the early beginning of the project together with ongoing review and analysis lead us to the successful end of this project.

All three of the MORE ERW risk factors combine on this project: Locations was exactly defined by the project scope, including the area and depth required for assessment. Not all locations required assessments to the same depth, thereby enabling significant cost savings. The entire spectrum of Angolan explosive contamination was present, from mined SHA/CHA in some areas to residual ERW risk on other parts.
III. ANALYSING ERW RISKS AND EVALUATING ERW RISKS

Analysing ERW risks was a very important part on this project. It was impossible to define one standard risk assessment for the whole project.

The matrix method was a more basic method for assessing risk, which was used initially. Additionally, all information was augmented by statistical analysis of historical data and Structured What If Techniques, giving the possibility of using the most appropriate method for treating the risks.

Risk evaluation is the process of deciding which risks require treatment and to prioritise treatment action. Risk evaluation involves the comparison of the results of risk analysis with risk criteria identified as part of the context analysis.
IV. Treating ERW risks

- **Our fundamental suggestion was avoiding the risk** where possible. This was done by including the possibility of re-planning or re-designing the project in order to avoid risks. The primary method of redesign was either rerouting the planned line path, or adjusting the locations of planned support structures to an area of decreased risk.

- **Removing the risk source** this was also a very common way on the area where information confirmed the presence or risks from mines and ERW.

- **Changing the likelihood** of a negative event was employed through the entire project. For example, workers and engineers were educated about ERW risks, and informed about how to report ERW finds.

- **Changing the consequences** of an event was employed on the project by wearing appropriate Personal Protective Equipment, when necessary.
After finishing the project, the company performed several internal evaluations in order to update existing procedures to incorporate all what we learned on this project. As a result, we now put more focus on information management and GIS on all spheres of project. This change helps provide a totally new perspective of decision making and project management.
This project gives us possibly to apply really whole cycle of Management of Residual ERW. The 1600 km project was very demanding. The main challenge proved to be how to best define risk for every small location and then how to treat that risk in the most efficient way.

Conclusion