UXO survey strategies for cable installation project

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ABSTRACT

This paper will describe the process of UXO Mitigation, starting with the Risk Assessment and outlining the main characteristics of UXO Survey, with the aim of providing an indication of best practice in terms of the processes to be carried out, areas to be investigated and method of UXO detection. An overview is then provided of commonly used methods of reducing the risk while engineering the route once potential UXO are identified, such as the ALARP principle and identification and removal of all potential UXO targets.

KEYWORDS

UXO Survey; Submarine cables; ALARP; Desktop Study; Route engineering; Survey sequence; Survey corridors

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INTRODUCTION

In recent years the increasing requirement for greater safety including Unexploded Ordnance (UXO) risk tolerance has had a knock-on impact to the cable business, which could be seen in various aspects, from technical and procedural viewpoints, or in timings and even on cost. These requirements and impact have led to the concept of ALARP (As Low As Reasonable and Practicable) becoming the industry standard requirement for UXO Risk Reduction. This concept will be better described in the next paragraphs, but the idea is to minimize the risk of encountering UXO during the execution of a project up to a level where spending more money will not significantly reduce the risk, also saving the general balance of the project itself.
UXO Survey is clearly required on the grounds of safety, with particular attention of course to safety for human life, but also for equipment and in case of submarine projects also for vessels. Considering the definition of the ALARP level and the importance for safety, insurance companies have started to also require ALARP certification to be in place to cover the operation of any sub-sea activity.
An important aspect to be considered is in the basis of the ALARP concept and to reach a level that provides safety without seriously limiting the economic feasibility of the project. ALARP is not to be considered as cost but as a method to identify an appropriate level of safety. Activities that are more stringent than the ALARP level could be considered a waste of time and money that can be saved.
The above is relevant because sometimes the interpretation of the meaning of ALARP, changing to "as low as reasonably possible". This replacement means the needs to do everything that is possible utilizing any methodologies available on the market, and all possible time, to reduce the risk to encounter UXOs during the project, but not considering the probabilities and the costs. This approach could have important impacts on plan and on cost of a project without producing a real benefit in terms of risk reduction.
Noteworthy, seabed mobility and human activities (such as fisheries trawls, anchors, etc.) could impact on the morphology and on targets transportation. This means that according with the above topics, ALARP or UXO survey data have a temporal validity.
This paper would like to present a "good practice" strategy to better achieve the ALARP level of risk reduction, with particular attention on submarine cable installation projects.

THEORY

The aim of the ALARP approach is to effectively mitigate the risk from UXO to cable installation projects with an appropriate management strategy that should be implemented at the start of the project. This would include as a minimum the following 4 stages:

- Planning:
  - Initial UXO Screening
  - And / or detailed UXO Risk Assessment
- Preparation:
  - Risk Mitigation Strategy Design
- Implementation:
  - Proactive mitigation including a possible combination of Survey, Re-routing and / or Investigation and Disposal
  - Reactive Mitigation including screens, blast mitigation, supervision, and monitoring.
- ALARP Sign-off; including details of any residual risk management.

This first stage of the process is the UXO screening and / or detailed desk-based assessment. The screening comprises a high-level review of a site to identify whether there could be a UXO risk. If the Screening and / or the detailed UXO Risk Assessment determines that there is a Low UXO Risk, then the ALARP Sign-off can be provided at this stage. This could be for an entire route, or just part of it. It could also just be for a specific activity, for example geotechnical investigations, which may have a lower probability of encounter than trenching an entire cable route for example.
If the screening undertaken identifies a potential UXO Risk, a more detailed UXO Risk Assessment would then be required. This would be in the form of a UXO Desk Top Study (UXO DTS). The DTS should cover the following topics as a minimum: