Draft Terms of Reference

CEDA/HSB/IFHS Working Group on Managing UXO's and associated risks in coastal and nearshore projects: recommendations to plan and execute projects safely and efficiently

October 2025

Introduction

During WW1 and WW2 and shortly afterwards bombs, grenades, mines, and many other types of ammunition were dropped, planted or dumped, and failed to detonate (at the time and since then). Both on land and at sea hotspots with high density of Unexploded Ordnance ("UXO") potentially capable of exploding are known, whilst in other areas the probability of encountering such objects are less clear.

The immediate **danger** of UXO's is clear: detonation upon mechanical impact, and the demolishing impact on equipment, humans, and nature nearby. Besides detonation upon impact, there is also the danger of environmental contamination from leakage due to degradation of munition casings.

However, the **risk** of UXO's (presence, explosive capacity, actual state) is far from clear, because of the many uncertainties involved, i.e.:

- Locations where UXO have been planted, dumped or dropped are unclear due to inaccuracy of records and a constantly shifting environment;
- The likelihood of encountering ordnance, depends primarily on the combination of two factors: 1. Presence of ordnance at a certain site (which is a statistical parameter), and 2. The extent of the dredging/digging operations for a project (both horizontal and vertical) ;
- Identification of targets as being a UXO, including the type/size and burial depth of the object in the seabed, is difficult even with the most advanced geophysical methods, whereas some dangerous ordnance cannot be found by these investigations;
- Many decades after being dropped, dumped or planted, the state of the ordnance, especially the potential to actually explode, is often difficult and sometimes impossible to ascertain beforehand;
- Human activities to investigate, in a marine environment, the presence and state of targeted objects which may be UXO, are not only costly but also involve significant dangers and risks;
- Construction work for coastal and nearshore projects (for instance trenching, dredging, pile driving, etc) implies physical disturbance of the seabed and the UXO's encountered. Type, size and state of the UXO will determine whether this could result in an explosion, the extent of the explosion and the consequences thereof. Both the probabilities and the consequences thereof show very wide ranges.

Consequently, dealing with this risk is a difficulty for project owners preparing for coastal or nearshore projects. It is not only a technical/numerical problem, but also involves ethics as to how much resources the owner should apply to (partially) reduce risks, and/or conscientiously allocating risks to contractors.

Legislation regarding UXO and safety protocols are primary national and have been noted to differ considerably, so for identical problems different practices may be applied in various countries, which are not necessarily optimal. Also the advise of experts is known to vary widely, which may be partly explained by commercial bias.

For many non-UXO-specialists involved in coastal and nearshore projects, the many uncertainties in detection and characterisation of UXO's, as well as the risks involved, are not well known or understood. More general, UXO's instil emotion (fear, uncertainty), and this in itself can be an obstacle to a rational approach.

CEDA[1] and HSB/IFHS[2] have decided to establish a Working Group (WG) to prepare an information paper on the subject. The paper is to provide a structured overview of key uncertainties and risks, available investigation techniques, practices, (national) responsibilities of all parties, liabilities and legislation. A qualitative analysis of the options for risk mitigation is to be included, with quantitative examples when possible.

Case studies should provide examples how the problem is approached in practice.

CEDA and HSB/IFHS propose the following Terms of Reference for the Working Group. The TOR will be formally established by the Working Group at their first meeting.

Objectives of the WG

The objective of the Working Group is to provide a structured overview of options to detect, assess, manage, and mitigate risks in coastal and nearshore projects regarding planted, dumped or dropped UXO, with recommendations how to plan and execute a project safely and efficiently regarding these risks.

Scope of Work

- Define the minimum specifications and scope of historical research/desk studies
- Overview of survey/investigation methods with strengths and weaknesses/limitations
- Outline of legislation and protocols for selected countries
- Key characteristics of typical UXO's, including effect and impact of detonation
- Risk assessment methods, to assess/quantify risks uniformly
- Safety concepts i.r.t. UXO's potentially encountered in coastal and nearshore projects, including societal risk approach
- Contract arrangements balancing risks and responsibilities of owners and contractors, and insurance consequences
- Recommendations to bridge/eliminate the knowledge gap between specialists of different background (UXO specialists, coastal project engineers, geophysical specialists and hydrographic surveyors, contract lawyers, safety authorities);
- Case studies (3-5)

[1] *CEDA: Central Dredging Association*

[2] *HSB/IFHS: Hydrographic Society Benelux/ International Federation of Hydrographic Societies*

Not in scope:

- Developing safety/operational protocols for employers, contractors, and other actors
- Clearance actions

WG members: Which candidates are invited to apply?

Candidates are preferably selected to arrive at a balanced representation from the various CEDA and HSB/IFHS stakeholders and countries, and be complementary in terms of expertise and experience.

Candidates are preferred to have:

- An open mind to consider UXO's from various perspectives, including the technical dangers, individual and societal risk, and the economic rationale;
- The capability to structure complex and dynamic information;
- The desire to work together with the members of the WG to summarise and communicate the results.

CEDA and HSB/IFHS are looking for members for the Working Group with expertise in one or more relevant key topics, like:

- UXO's and their characteristics as typically found in coastal and nearshore projects (or be potentially present);
- Geophysical measurement methods including their reliability and precision in identifying/targeting UXOs;
- Detonation and the immediate nearby physical effects;
- Legal framework and specific safety protocols as applicable in various countries;
- Risk-based analyses;
- Allocating and managing risks in contracts for coastal and nearshore projects.

Note: Chairperson and secretary preferably agreed before ToR is launched.

Target audience

- Project owners;
- Civil Engineers;
- Survey contractors;
- Marine contractors.

Code of conduct

The WG shall act strictly pre-competitive, and free of commercial and/or political interest. Available data, historical as well as recent, national as well as international, shall be used as the basis for the analysis.

Technological capabilities shall be evaluated by addressing both potential developments in the near future (TRL 5[3] and above), as well as intrinsic limitations. Expert views shall be subject to peer review, and likely controversial opinions are to be marked clearly. Commercial interests shall not influence the work. Financial, commercial, contractual and legal consequences are to be analyzed in a neutral manner.

Meetings

- Online meetings;
- Hybrid meetings at office locations of WG members as decided by the WG.

Timeline

- First meeting: June/July 2025;
- Expected to deliver report within 18 months.

Deliverables

- Information paper (40 pages + appendices);
- Presentation of results by WG members at CEDA and HSB/IFHS events is intended;
- The paper shall be in English. Summaries in selected languages are optional.

[3] *TRL: Technology Readiness Levels (TRL) are a type of measurement system used to assess the maturity level of a particular technology. Each technology project is evaluated against the parameters for each technology level and is then assigned a TRL rating based on the projects progress.*