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UXOmob: Site management tool for munitions contaminated areas

The only publicly available tool

Map of the return time for wave-induced
mobilisation
@Menzel et al. 2022 Toxics

The UXOmob tool is the only publicly available instrument in the world that is capable of determining the burial and mobilisation of Unexploded Ordnance (UXO) and other objects on the seabed. It takes into account both wave- and current-induced processes.

UXOmob enables a comprehensive analysis of burial caused by scour in the near field as well as by morphodynamic processes. Thus, possible re-exposure is also mapped. The mobilisation is determined on the basis of the forces acting on the individual object, taking into account the geometry, the burial depth, the sediment properties, the water depth and the weather situation.

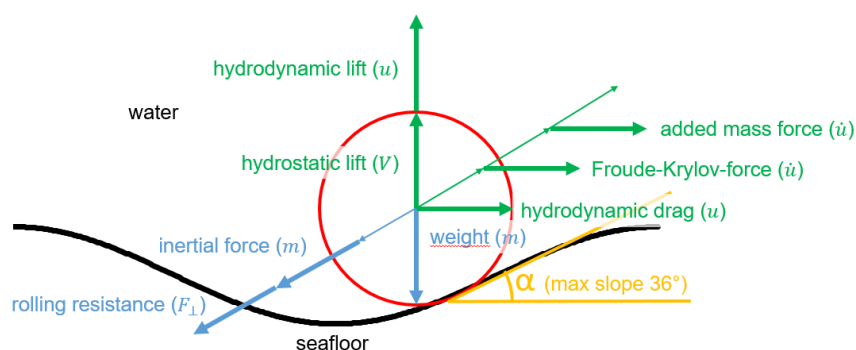
Through a possible coupling to the drift model, long-term displacements of objects can also be predicted. UXOmob is thus a comprehensive tool for determining the burial and mobilisation of UXO and other objects on the seabed, which takes all relevant processes into account.

Contact

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Loads on a cylindrical object in a symmetrical scour cavity in the presence of waves



Experimental investigations with two different objects.
@Daniel Klemmt - Corvus Works

Properties

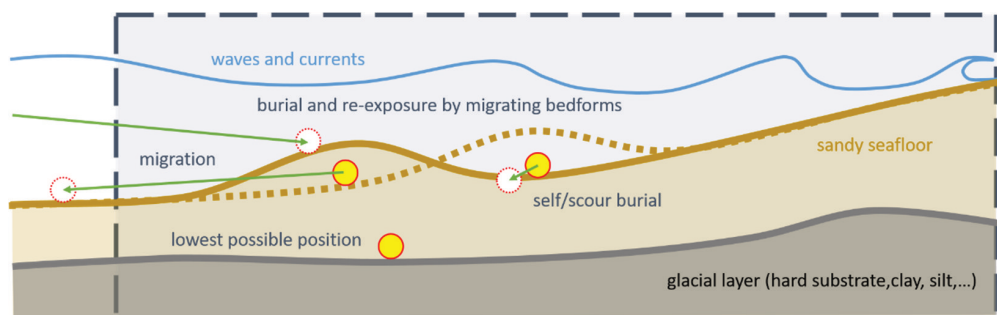
- General properties:
 - More than 10 years of experience
 - Consideration of the most important physical processes
 - Calculation of burial
 - Calculation of mobilisation
 - Export for presentation in GIS
 - Methods validated and published
 - Individualisation possible through integration of new objects
 - Determination of object properties through experiments and simulations

Applications

- Predicting the potential mobilisation and drift of objects for planning purposes
- Monitoring of individual objects and sea areas

Some examples of current use:

- Determination of the mobilisation probability of UXO in the North Sea
- Sanding, mobilisation and re-exposure of ammunition dumps at Fort Pierce / USA
- Monitoring the mobilisation of individual objects based on the current weather situation



Conceptual drawing of possible processes of burial, re-exposure, and migration of UXO in the area of interest. Yellow circles with red outline represent the original position of the UXO, white circles with dashed red outline represent the position after migration, with the direction indicated by a green arrow.

Publications



- Determination of the drag, lift and added mass coefficients of special unexploded ordnance (UXO) as a function of the Reynolds number and the burial depth
DOI: 10.1016/j.apor.2024.103946
- Mobilization of Unexploded Ordnance on the Seabed
DOI: 10.3390/toxics10070389
- Mobilisation of UXO, caused by hydrodynamics
The UACE2019 Proceedings
- An advanced structural mechanical approach to fatigue lifetime prediction of submarine cables
DOI: 10.1201/9781003134572-42
- Towards a general prediction-model for the current-induced mobilisation of objects on the sea floor
DOI: 10.1016/j.oceaneng.2018.06.047
- Prediction of the initial movement of objects on the sea floor
DOI: 10.1109/OCEANSE.2017.8084925
- Flow and scour around cylindrical objects in laboratory experiments
DOI: 10.1109/OCEANS-Bergen.2013.6607970
- Experimental Investigations of Mixing-Processes in The Wake of A Circular Cylinder in Stratified Flows
DOI: 10.1063/1.2747420
- Scour and scour prediction in the vicinity of offshore constructions
Wachstums Kern Offshore Wind Solutions (OWS-MV) Offshore Wind Solutions MV
- Scour and scour prediction in the vicinity of offshore constructions
Offshore Wind Solutions MV
- Prediction of the initial movement of objects on the sea floor
OCEANS 2017 - Aberdeen
- Numerische Simulation des Sedimenttransports im Modellmaßstab
22. GALA-Fachtagung "Lasermethoden in der Strömungsmesstechnik"
- Laborexperimente zur Umströmung und Versandung zylindrischer Objekte am Meeresboden.
DWT-Tagung „Schall und Schwingungen Wellen und Turbulenz in sensibler Umgebung“

More information:

