Environmental Aspects of Offshore Wind Energy

The German Program on Underwater Munitions: An introduction with regard to national offshore projects

Who is speaking

- State Gov. of Schleswig-Holstein (Ministry for Energy, Agriculture, the Environment, Nature and Digitisation)
- co-author and co-developer of the growing project [www.underwatermunitions.de](http://www.underwatermunitions.de)
- managing director of BLANO Expert group on underwater munitions, Germany
Artillery shells on seabed

Geschosse auf Grund


Von Katina Schröder

13. Juli 2013, 12:00 Uhr / Edition am 15.

Windfarm Riffgat: grand opening - without powerline

Did you notice?

- Moored sea mine floated off Windfarm „Godewind“ on January, 10th
- Detonated on purpose next day, close to port of Wilhelmshaven
Two unlucky projects or hint for risk that matters?

Examples from German Media (Year 2012)

Alte Ankertaumine geht einem Fischer ins Netz
Munition torpedoed Windparks
Altlasten aus Weltkrieg gefährden Ausbau erneuerbarer Energien
Sechsjähriger findet giftigen Munitionsrest am Ostseestrand

Krater von sechs Metern Tiefe
Deutsche Grundmine am Strand von Wangerooge gesprengt
Mines found near Baltic-1-Stromtrasse

Minensprengung in Ostsee verstieß gegen EU-Recht
WSP-WHV: Bombenräumung mal anders: Vertreibung von Seehunden wegen Sprengung in der Osterems

Bernstein mit Phosphor verwechselt:
Junge Mutter ging in Flammen auf
Scharfe Granate beim Hafenkapitän abgegeben
Regierung: Keine Gefahr durch Munition im Meer

Weitere Minenfunde in der Ostsee sorgen für engere Schiffsrouter

www.underwatermunitions.de
Kalifornien (D)
The boy with yellow hands

End Juli 2012 – tourist beach close to Kalifornien, Municipality Schönberg, Kreis Plön, Schleswig-Holstein

What about?

Warfar material

Munition

konventionell

Fuse

Chemical warfare agent

Ignition agent

pay load

Explosive or

Chemical warfare agent contained or louse
Pathways & fate of sea dumped warfare material

Offshore Wind & mine countermeasures during WW II
Offshore power- and pipe lines & likelihood to encounter large WW II UXO

Encounters
2016: 9
2015: 36
2014: + 16
2013: > 30 t

26 large munition items
20 large munition items
10 large munition items
Dumping of chemical weapons

Chemical Munitions and barrels with S-Lost on Board of “Marcy” at Nordenham (Bremerhaven) - dumped under supervision of U.S. Military Administration in Germany in the Skagerrak.

www.underwatermunitions.de

KC 250 Tabun
Chemical bomb
dumped: 28.04-03.05.1945
remediated: 1960

15 cm Tabun Shell
dumped: 28.04.1945
remediated: 1960

Moored mines Baltic Sea

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Environmental impact

Problem areas

Corrosion
Release of chemical compounds into sea water and sediment

Noise of blasts
et. al. Risk for divers and sea mammals.

Sea dumped chemical weapons – Northeast Atlantic

© Google Earth + http://cns.miis.edu
NATIONAL PROGRAM ON UNDERWATER MUNITIONS

Milestones

1940er

1969/71
„Jäckel-Report“ on offshore dumping of chemical munitions (Min. of Defense)

1993

2009
Update und expansion of the study of FMA from 1993
- geographically on German territorial waters
- thematically on conventional munitions
Overall assessment (Effective 2011)

Currently, it is not discernible that a large-scale threat to the marine environment exists beyond the local area of munitions contaminated areas, nor is any foreseeable in the future.

Hazards exists for people involved in activities bringing them into direct contact with the sea floor of the North and Baltic Seas.
Simplified Chart on munitions-contaminated areas (2011)

- German part of North Sea
  - rd. 1,300,000 t
  - rd. 90 t

- Munitions
  - conventional
  - chemical

- German part of Baltic Sea
  - rd. 300,000 t
  - rd. 5,000 t

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**Legende**
- munitions dumpsites
- munitions-contaminated area
- suspected munitions-contaminated area

Number and density of symbols do not reflect the magnitude of potential munitions contamination. (t = metric tons)!
Notification and reporting system

- Incidents with
  - UXO, DMM or munitions constituents offshore:
  - Explosives, Chemical Warfare Agents (CWA) or white Phosphorus

- Unified vocal point founded recently
- Operational 2013

www.underwatermunitions.de

Reports of incidents

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<table>
<thead>
<tr>
<th>Year</th>
<th>Reports</th>
<th>Mun. Items</th>
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<td>2013</td>
<td>148</td>
<td>117</td>
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<td>2016</td>
<td>264</td>
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Research in German und International Military archives

- German Federal Archives
  - Department Military Archive (Freiburg)
  - German Military History Office

- Municipal and local archives
  - Sea port records
  - Village and town chronicles

- International archives
  - Imperial War Museum (London)
  - The National Archive, Washington DC.
  - Archive of Allied Forces Council (WW II)

Are these mines anywhere?

4 Halifax and 43 Stirling Aircrafts deployed ground mines - 9 mines have fallen on land
British ground mine Mark VI

The munitions cadastre

https://www.amucad.org
Transparency & awareness

Munitionsbelastung der deutschen Meeresgewässer

Munitions in German Marine Waters - Stocktaking and Recommendations

Effective: December, 5th, 2011; abridged Version - translation as of April 2012

www.underwatermunitions.de

„Living document“

• Annual updates

www.underwatermunitions.de
Experiments with Bundeswehr Technical Center for Ships and Naval Weapons

"Bionicles" for UXO recovery

Prof. Staubach, Nadal – Weißensee Kunsthochschule, Berlin 2013
Explosives & marine ecosystem

Homepages of projects

- CHEMSEA – chemical munitions
  - www.chemsea.eu
- DAIMON – decision support
  - www.daimonproject.com
- UDEMM – explosives in marine environment
  - https://udemm.geomar.de
- RoBEMM – robotic remediation
  - www.munitionsraeumung-meer.de
- MUNITECT – efficient sensors
  - www.munitect.de
- USA – projects of DoD
  - https://www.serdp-estcp.org