

ET 49: Impulsief geluid

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Tabel 2. Aantal dagen met piling voor de constructie van offshore windparken (per maand en per jaar)

	Jan	Feb	Mar	Apr	Mei	Jun	Jul	Aug	Sep	Okt	Nov	Dec
2009									19	16	1	6
2010	13	1										
2011				16	15	14	12	12				
2013	1	4		6	10	10	15	24	8			
2016					4	10	12	13	12			

Tabel 3. Ontmoetingen met Uxo tussen 2005 en juni 2016 (N/A: data niet beschikbaar)

Datum	Resultaat	Pos N	Pos E
5/04/2005	Vernietigd	51,583333	2,883333
11/04/2005	N/A	51,520833	2,822333
13/04/2005	Vernietigd	51,433500	2,711367
21/04/2005	Vernietigd	51,170933	2,550883
21/04/2005	Vernietigd	51,547250	3,064267
22/04/2005	Vernietigd	51,166483	2,603067
26/04/2005	N/A	51,641702	2,904633
27/04/2005	Vernietigd	51,504800	2,795583
2/05/2005	N/A	51,186500	2,770417
2/05/2005	N/A	51,360333	2,399667
3/05/2005	Vernietigd	51,605117	2,910917
10/05/2005	Vernietigd	51,529050	2,966667
12/05/2005	N/A	51,755833	2,622167
18/05/2005	Vernietigd	51,643333	2,877150
26/05/2005	Vernietigd	51,455685	2,366717
15/06/2005	Vernietigd	51,486000	2,861333
29/06/2005	Vernietigd	51,489500	2,928500
29/06/2005	Vernietigd	51,639900	2,902480
31/08/2005	Vernietigd	51,184417	2,624567
10/10/2005	N/A	51,549667	2,738833
12/04/2006	N/A	51,436167	2,654500
11/05/2006	Vernietigd	51,567000	3,056667
19/07/2006	Vernietigd	51,535033	2,871933
22/08/2006	Vernietigd	51,529167	3,032500
26/09/2006	N/A	51,599367	2,300633
19/03/2007	N/A	51,728033	2,815000
3/04/2007	Vernietigd	51,597975	2,995377
7/06/2007	Vernietigd	51,394178	2,672373
7/06/2007	Vernietigd	51,498650	2,771235
30/08/2007	Vernietigd	51,612485	2,793583
13/09/2007	N/A	51,467167	2,617167
29/01/2008	Vernietigd	51,561767	2,884850
13/02/2008	N/A	51,288400	2,668250
14/02/2008	N/A	51,561297	2,961988
21/02/2008	Vernietigd	51,518675	2,979498
3/04/2008	N/A	51,587305	3,041153
7/04/2008	Vernietigd	51,529352	2,835500
7/04/2008	Vernietigd	51,584085	3,043357
16/04/2008	Vernietigd	51,586000	3,041833
3/06/2008	Vernietigd	51,230667	2,551817
3/06/2008	N/A	51,582183	2,997917
29/07/2008	Vernietigd	51,366500	2,578800
22/08/2008	Vernietigd	51,327067	2,873483
28/02/2009	N/A	51,508433	2,912083

28/02/2009	Vernietigd	51,550685	2,865183
28/02/2009	Vernietigd	51,604500	2,922500
22/04/2009	Vernietigd	51,459167	2,803667
27/04/2009	N/A	51,336367	2,443283
27/08/2009	Vernietigd	51,385247	3,045568
27/01/2010	N/A	51,476917	2,914600
22/03/2010	Vernietigd	51,553683	2,999833
24/03/2010	Vernietigd	51,512552	2,850133
6/04/2010	N/A	51,334458	2,539035
19/04/2010	Vernietigd	51,314667	2,710000
18/05/2010	N/A	51,379167	3,192333
1/06/2010	Vernietigd	51,459553	3,223450
3/10/2010	N/A	51,467333	2,842167
14/10/2010	Vernietigd	51,568618	2,853813
14/10/2010	N/A	51,712113	2,742333
2/11/2010	Vernietigd	51,375667	3,160333
15/02/2011	Vernietigd	51,400000	3,100000
21/02/2011	Vernietigd	51,371667	3,163333
23/02/2011	Vernietigd	51,489900	2,837245
19/05/2011	Vernietigd	51,708800	2,728858
7/06/2011	Vernietigd	51,423000	3,104000
27/07/2011	Vernietigd	51,416000	3,274833
22/12/2011	N/A	51,589085	2,837617
6/01/2012	Vernietigd	51,304883	2,727233
23/02/2012	Vernietigd	51,619133	2,899850
30/05/2012	Vernietigd	51,332155	2,919273
23/07/2012	Vernietigd	51,450000	3,183333
10/08/2012	Vernietigd	51,412000	3,248167
20/12/2012	N/A	51,476667	2,703333
19/01/2013	N/A	51,215167	2,719333
13/02/2013	Vernietigd	51,476867	2,708067
25/06/2013	N/A	51,381600	3,029567
22/10/2013	Vernietigd	51,481500	2,852800
20/02/2014	Vernietigd	51,531667	2,832083
12/03/2014	Vernietigd	51,312000	2,448500
17/07/2014	Vernietigd	51,470333	2,843833
27/08/2014	N/A	51,488027	2,381377
2/12/2014	N/A	51,475715	2,893735
4/04/2015	N/A	51,447633	3,088817
4/04/2015	Vernietigd	51,542667	2,701000
4/04/2015	N/A	51,720933	2,494300
27/05/2015	N/A	51,395667	3,247167
22/07/2015	Vernietigd	51,266667	2,900000
24/07/2015	Vernietigd	51,274000	2,902167
10/09/2015	N/A	51,507333	2,539167
16/09/2015	N/A	51,375000	3,205000
24/02/2016	Vernietigd	51,489433	2,859217
3/03/2016	N/A	51,491167	2,856667
20/04/2016	N/A	51,518000	3,068333

Expressing underwater sound levels (after Ainsly, 2011; Müller & Zerbs, 2011; Norro et al., 2013a)

Underwater acoustics are expressed in a logarithmic scale (decibels). In order to characterize extreme level values of a transient signal like the one associated with pile driving, the peak sound pressure level has been used. This terminology is not totally unambiguous and we prefer to use L_{z-p} that is defined by Ainslie (2011) as:

$$L_{z-p} = 10 \log_{10} \frac{p_{z-p}^2}{p_{ref}^2}$$

For impulsive sound, however, the unweighted SEL better characterises the energy produced by a given stroke, extracted from a complete piling event. SEL is computed as defined by Ainslie (2011). The SEL is the level of a continuous sound during the integration period and having the same sound energy as the impulse:

$$SEL = 10 \log \left(\frac{1}{T} \int_{T_1}^{T_2} \frac{p(t)^2}{p_0^2} dt \right)$$

where T is 1 second, and T_1 and T_2 are, respectively, the start and the end of the integration time window (the complete stroke being included in this window), $p(t)$ is the sound pressure signal, and p_0 is the reference sound pressure of $1 \mu\text{Pa}$. When more than one sound pulse is generated as is the case for pile driving, it is in theory possible to compute a cumulative sound exposure level using the number of blows and the number of piling events.

Measurements made at various distances were normalized to a reference distance of 750 m using, according to Müller & Zerbs, 2011):

$$L_{norm} = L_{measured} + 15 \log_{10} \left(\frac{\text{distance (m)}}{750 \text{ m}} \right)$$

This normalization has been used in this study in order to allow for an appropriate comparison of sound characteristics collected at various distances from the source using a normalized transmission loss (Nehls et al., 2007; Müller & Zerbs, 2011) permitting comparison with other sites and piling characteristics.

The third octave band spectrum of the underwater sound pressure level was computed according to the norm IEC1260. All these computations were made using dedicated routines developed using the MATLAB environment.

Annex 2

Explosives chart for reporting encounters with UxO, and notification instructions



Explosievenkaart



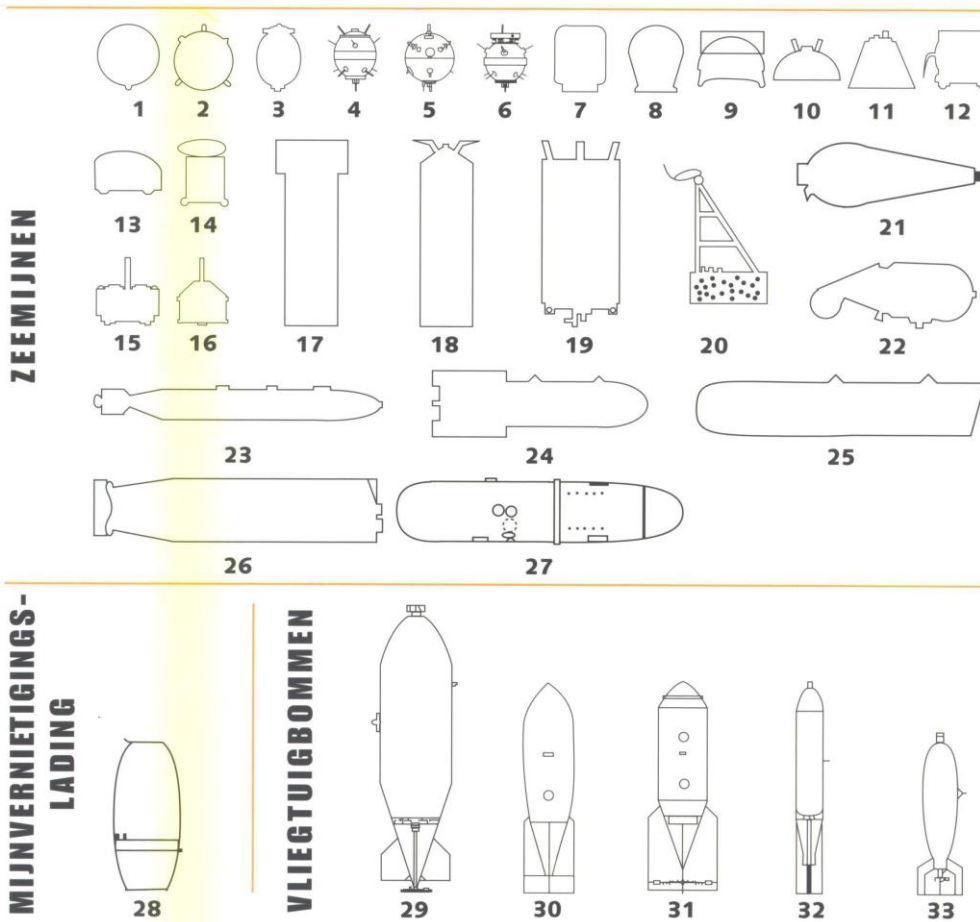
Hulpmiddel voor herkenning van explosieven

Een explosief opgevist?

Meld dit onmiddellijk aan het MRCC via tel.: 059/70.11.00 of via VHF kanaal 9. Vermeld de positie waar het tuig gevonden werd, alsook het nummer van de onderstaande tuigen waarop het gevonden exemplaar lijkt.

Markeer het tuig zo goed als mogelijk!

Raadpleeg eveneens BAZ nr.1.



GRANATEN & HULZEN



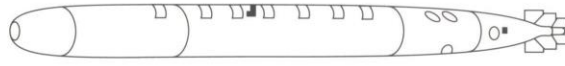
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MORTIEREN



35

TORPEDO'S



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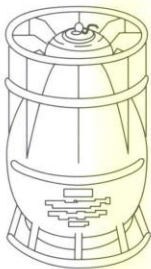


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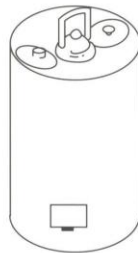
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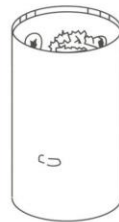
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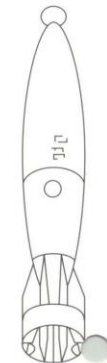
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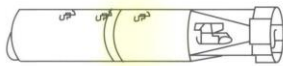
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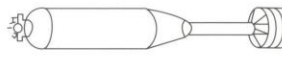
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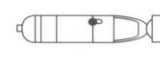
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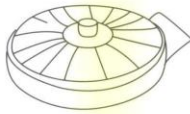


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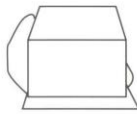


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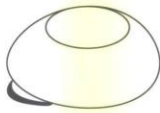
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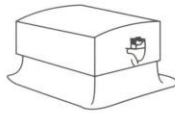
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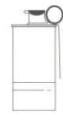


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HANDGRANATEN



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