



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

Hydraulic Response of Rubble Mound Breakwaters

scale effects - berm breakwaters

Andersen, Thomas Lykke

Publication date:
2006

Document Version
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Andersen, T. L. (2006). *Hydraulic Response of Rubble Mound Breakwaters: scale effects - berm breakwaters*. Hydraulics & Coastal Engineering Laboratory, Department of Civil Engineering, Aalborg University.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

APPENDIX A

Table with Berm Breakwater Test Results

In the following tables the main results from the present physical berm breakwater model tests are given. The wave parameters are related to the incident waves calculated from the Mansard and Funke, 1980 and Frigaard and Brorsen, 1995 method.

Description of parameters in tables:

1. Test number.
2. Indicate if the front is fixed with a net as described in section 3.5.
3. Armour configuration. the number refers to the different armour stones given in Table 3.1 and 3.3.
4. Water depth at toe of structure.
5. Initial berm width.
6. Initial crest freeboard.
7. Initial crest width.
8. Initial water depth above berm (negative value indicate berm initially is located above SWL).
9. Amplitude reflection coefficient at toe of structure calculated as given in Eq. 1.20 from the Mansard and Funke, 1980 method.

-
10. Incident significant wave height at toe of structure calculated from the spectral analysis.
 11. Incident peak period at toe of structure.
 12. Incident mean wave period $T_{-1,0}$ at toe of structure calculated from spectral analysis.
 13. Incident mean wave period $T_{0,1}$ at toe of structure calculated from spectral analysis.
 14. Spectral width parameter of incident waves (narrowness parameter).
 15. Spectral width parameter of incident waves (broadness factor).
 16. Incident significant wave height from time domain analysis.
 17. Incident $H_{1/10}$ wave height (average of 1/10 of the highest waves).
 18. Incident $H_{1/100}$ wave height (average of 1/100 of the highest waves).
 19. Incident mean wave period calculated from zero-downcrossing analysis.
 20. Skewness of surface elevation.
 21. Recession of berm (defined in Fig. 2.1). Recession is of cause not given for tests with fixed front. Due to the very limited recession in tests with Armour 1 the recession was for each cross section first measured after completion of a group of sea states.
 22. Mean wave overtopping per meter structure.
 23. Rear slope damage (0 = no damage; 1 = start of damage; 2 = moderate damage; 3 = severe damage).

Table with Berm Breakwater Test Results

Test No.	Fixed Front	Arm our	h [m]	B [m]	R_c [m]	G_c [m]	h_b [m]	C_r	H_{m0} [m]	T_p [s]	$T_{-1,0}$ [s]	$T_{0,1}$ [s]	ϵ_2	ϵ_4	$H_{1/3}$ [m]	$H_{1/10}$ [m]	$H_{1/100}$ [m]	T_z [s]	b_1	Rec [m]	q [m ³ /m/s]	Rear Dmg.
661	No	4	0.23	0.21	0.09	0.16	-0.02	0.22	0.061	1.14	1.03	0.97	0.293	0.586	0.060	0.078	0.108	0.94	0.21	0.214	8.03E-07	0
662	No	4	0.23	0.21	0.09	0.16	-0.02	0.22	0.067	1.16	1.06	1.00	0.291	0.578	0.066	0.085	0.112	0.96	0.17	0.246	1.19E-06	0
663	No	4	0.23	0.21	0.09	0.16	-0.02	0.21	0.070	1.19	1.10	1.03	0.295	0.584	0.069	0.087	0.116	0.99	0.22	0.262	4.24E-06	2.5
664	No	4	0.23	0.21	0.09	0.16	-0.02	0.18	0.073	1.22	1.12	1.05	0.295	0.586	0.071	0.089	0.116	1.02	0.30	0.280	1.22E-05	3
665	No	4	0.23	0.21	0.09	0.09	-0.02	0.25	0.056	1.05	0.97	0.91	0.278	0.566	0.055	0.069	0.092	0.88	0.13	0.160	3.44E-07	0
666	No	4	0.23	0.21	0.09	0.09	-0.02	0.22	0.057	1.09	1.01	0.95	0.290	0.583	0.057	0.074	0.100	0.90	0.17	0.205	1.49E-06	1.5
667	No	4	0.23	0.21	0.09	0.09	-0.02	0.22	0.062	1.11	1.02	0.96	0.288	0.574	0.062	0.080	0.103	0.92	0.19	0.227	3.32E-06	2
668	No	4	0.23	0.21	0.09	0.09	-0.02	0.20	0.064	1.14	1.06	0.99	0.290	0.579	0.064	0.082	0.107	0.97	0.22	0.245	1.03E-05	3
669	No	4	0.23	0.21	0.07	0.09	-0.02	0.23	0.054	1.02	0.97	0.91	0.273	0.556	0.053	0.068	0.088	0.88	0.13	0.170	4.44E-07	1
670	No	4	0.23	0.21	0.07	0.09	-0.02	0.20	0.055	1.00	0.99	0.93	0.282	0.572	0.054	0.069	0.092	0.90	0.15	0.196	2.07E-06	2
671	No	4	0.23	0.21	0.07	0.09	-0.02	0.21	0.059	1.14	1.01	0.95	0.287	0.575	0.059	0.075	0.100	0.91	0.20	0.218	5.98E-06	3
672	No	4	0.23	0.21	0.07	0.09	-0.02	0.21	0.062	1.11	1.04	0.98	0.289	0.577	0.062	0.080	0.106	0.94	0.21	0.234	1.43E-05	3
673	No	4	0.23	0.34	0.06	0.12	-0.02	0.20	0.045	0.95	0.90	0.86	0.257	0.529	0.044	0.055	0.071	0.84	0.07	0.110	0.00E+00	0
674	No	4	0.23	0.34	0.06	0.12	-0.02	0.18	0.047	1.02	0.94	0.89	0.260	0.533	0.046	0.060	0.081	0.87	0.08	0.137	0.00E+00	0
675	No	4	0.23	0.34	0.06	0.12	-0.02	0.18	0.054	1.02	0.98	0.92	0.273	0.559	0.053	0.068	0.093	0.89	0.17	0.192	6.85E-08	0
676	No	4	0.23	0.34	0.06	0.12	-0.02	0.20	0.059	1.11	1.01	0.96	0.278	0.559	0.059	0.075	0.095	0.93	0.15	0.229	2.43E-07	0
677	No	4	0.23	0.34	0.06	0.12	-0.02	0.18	0.061	1.11	1.04	0.98	0.288	0.572	0.059	0.075	0.099	0.95	0.17	0.262	1.69E-06	2
678	No	4	0.23	0.34	0.06	0.12	-0.02	0.16	0.069	1.14	1.08	1.02	0.293	0.582	0.067	0.085	0.112	0.99	0.26	0.298	6.53E-06	3
679	No	4	0.23	0.26	0.09	0.16	-0.02	0.20	0.049	1.00	0.94	0.89	0.268	0.546	0.049	0.063	0.083	0.87	0.09	0.141	0.00E+00	0
680	No	4	0.23	0.26	0.09	0.16	-0.02	0.18	0.053	1.00	0.95	0.90	0.275	0.558	0.053	0.069	0.095	0.86	0.15	0.169	5.75E-08	0
681	No	4	0.23	0.26	0.09	0.16	-0.02	0.18	0.056	0.98	0.95	0.90	0.271	0.557	0.055	0.070	0.094	0.87	0.12	0.204	5.69E-08	0
682	No	4	0.23	0.26	0.09	0.16	-0.02	0.16	0.061	1.00	0.97	0.91	0.274	0.565	0.061	0.079	0.105	0.88	0.19	0.226	1.85E-07	0
683	No	4	0.23	0.26	0.09	0.16	-0.02	0.14	0.065	0.97	0.97	0.92	0.259	0.539	0.066	0.084	0.110	0.88	0.16	0.230	3.19E-07	0
684	No	4	0.23	0.26	0.09	0.16	-0.02	0.14	0.069	0.98	0.98	0.93	0.262	0.546	0.068	0.088	0.112	0.89	0.19	0.264	4.32E-07	0
685	No	4	0.23	0.26	0.09	0.16	-0.02	0.12	0.071	0.98	0.98	0.93	0.254	0.536	0.070	0.089	0.115	0.91	0.18	0.272	3.43E-07	0
686	No	4	0.23	0.26	0.09	0.16	-0.02	0.23	0.049	1.25	1.14	1.08	0.286	0.577	0.048	0.060	0.081	1.05	0.17	0.183	6.10E-08	0
687	No	4	0.23	0.26	0.09	0.16	-0.02	0.28	0.055	1.22	1.14	1.08	0.285	0.573	0.055	0.069	0.093	1.06	0.16	0.212	5.76E-07	0
688	No	4	0.23	0.26	0.09	0.16	-0.02	0.27	0.059	1.22	1.15	1.08	0.297	0.590	0.057	0.073	0.099	1.04	0.22	0.242	6.42E-07	1
689	No	4	0.23	0.26	0.09	0.16	-0.02	0.23	0.063	1.22	1.14	1.06	0.300	0.589	0.062	0.078	0.102	1.02	0.22	0.267	1.11E-06	1
690	No	4	0.23	0.26	0.09	0.16	-0.02	0.22	0.067	1.25	1.14	1.07	0.305	0.603	0.066	0.083	0.108	1.03	0.26	0.286	2.18E-06	2
691	No	4	0.23	0.26	0.09	0.16	-0.02	0.22	0.074	1.22	1.14	1.07	0.306	0.598	0.072	0.091	0.117	1.05	0.20	0.291	2.54E-06	2.5
692	No	4	0.23	0.26	0.09	0.16	-0.02	0.21	0.045	1.46	1.38	1.30	0.280	0.559	0.044	0.056	0.073	1.28	0.21	0.198	0.00E+00	0
693	No	4	0.23	0.26	0.09	0.16	-0.02	0.24	0.052	1.46	1.37	1.29	0.290	0.574	0.051	0.064	0.081	1.26	0.25	0.214	6.24E-07	0
694	No	4	0.23	0.26	0.09	0.16	-0.02	0.29	0.058	1.46	1.38	1.29	0.306	0.604	0.056	0.071	0.091	1.25	0.25	0.244	2.62E-06	1
695	No	4	0.23	0.26	0.09	0.16	-0.02	0.30	0.063	1.51	1.38	1.29	0.307	0.601	0.060	0.077	0.099	1.26	0.29	0.273	6.37E-06	2.5