



LNS Coastal Engineering Series: Course No. 2

25 Jan 2024

BERM BREAKWATERS: Design and Construction
By
Prof. Jentsje W. van der Meer
&
Mr. Sigurdur Sigurdarson



INTRODUCTION

The berm breakwater concept was “reinvented” in the eighties to provide wave protection for an airport runway extension into the sea in Unalaska, Alaska. The concept was later applied for the design of the breakwater at Keflavik, Iceland in 1983. Since then, many berm breakwaters have been built in Iceland and the rest of the World. The first berm breakwater in Hong Kong is at Hei Ling Chau, completed in 1999.

The primary advantage of the berm breakwater is that the required armour stones are smaller in size than those in a conventional rubble mound breakwater. Hence, the berm breakwater can be constructed with commonly available heavy construction equipment and with armour stones from local quarry sites at a cheaper cost. Moreover, the berm breakwater design allows waves to reshape the the berm to some extent and may have large resiliency against overload conditions. Compared with conventional rubble mound breakwaters, berm breakwaters have less overtopping rates, an attractive adaptive feature for Climate-resilience.

Manual and guidelines for the berm breakwater were first published in 2003 by Working Group 40 of the Maritime Navigation Commission of the International Navigation Association (PIANC, 2003). Since then, more research on berm breakwaters have been carried out to overcome the limitations of PIANC, 2003.

The scientific experience of Professor Jentsje van der Meer and the practical experience of Mr Sigurdur Sigurdarson in the design and construction of over thirty berm breakwaters all over the World was put together in a book published in 2017. It was written for practising coastal engineers with a scientific background which is also interesting to hydraulic modellers and researchers.

This web-based Course on berm breakwaters provides a great opportunity of the two internationally renowned coastal engineering consultants to address the contents of their above book with further experience since 2017 to an audience of coastal engineers and researchers in Hong Kong and beyond.

Synopsis

➤ **Topic 1 Design of berm breakwaters by Prof. Jentsje van der Meer**

Key Points

- Principles in the design of berm breakwaters
- Classification of berm breakwaters into hardly, partly and fully reshaping
- Predicting recession of the berm
- Wave overtopping geometrical design of the full cross-section
- Some examples of geometrical design into practice

➤ **Topic 2 Construction of berm breakwaters by Mr. Sigurdur Sigurdarson**

Key Points

- Armour stone gradings for berm breakwaters
- Quarry yield prediction and blasting for large armour stones
- Quarry planning
- CO₂ footprint
- Equipment, armour stone placement and tolerances
- Constructed examples

Who should attend?

- Civil Engineers in Works Departments, responsible for Seawalls & Breakwaters, Land Drainage & Flood Control, Flood Resilience & Climate Change, Research & Development, Main Drainage Channels as well as Coastal Highways & Reservoirs
- Consultants working in Coastal & Hydraulic Engineering projects
- Contractors under the Port Works, Roads & Drainage and Waterworks Categories
- Academia with research interests in coastal and hydraulic engineering

Programme Rundown

2:30 p.m.-2:35 p.m. Introduction of the speakers

2:35 p.m.-3:35 p.m. Topic 1:

3:35 p.m.-3:50 p.m. Discussion/Q&A

3:50 p.m.-4:05 p.m. Break

4:05 p.m.-5:05 p.m. Topic 2:

5:05 p.m.-5:30 p.m. Discussion/Q&A

Speakers



Prof. Jentsje W. van der Meer is an internationally renowned expert in appraisal, design and testing of (berm) breakwaters and coastal structures, including seawalls, levees, dikes, embankments, groynes, revetments and shingle beaches. He has worked with Delft Hydraulics (now Deltares) and Infram International, a private consultancy for infrastructure appraisal and management. For the past 16 years, he has provided consultancy advice to projects across the globe through his own firm, Van der Meer Consulting b.v. Prof. Van der Meer was a professor at IHE Delft, the world's largest international graduate water education facility, from 2014 until his retirement in 2021.

Prof. Jentsje W. van der Meer's work on rubble mound structures, including the Van der Meer design formula, has been included in engineering manuals all over the world. He co-authored both editions of EurOtop, the Overtopping Manual, and has published more than two hundred papers in international journals, proceedings and books. These include Design and Construction of Berm Breakwaters, co-written by Prof. Van der Meer and Sigurdur Sigurdarson. Prof. Van der Meer is also co-owner of the copyright for the hydraulic wave overtopping simulator, developed to test the strength of existing levees in the Netherlands, the US, Singapore and Vietnam under wave attack.



Mr. Sigurdur Sigurdarson has over 40 years of experience as a coastal and harbour engineer, both in Iceland as well as internationally, working on breakwater projects in all six continents. His main emphasis has been on coastal structures, including rubble mound and berm breakwaters, revetments, and groynes. He has been involved in all aspects from planning, establishment of environmental load and design criteria, design, model testing and armourstone quarry evaluation, through to tendering, construction management, supervision of construction and quarrying, as well as performance monitoring.

The development and design of berm breakwaters has been an important part of Sigurdarson's work. This has involved armourstone quarry assessment, material specifications, supervision of quarrying, advising contractors in blasting for armourstone, as well as design.

He has designed rubble mound and berm breakwaters in over fifty harbours in Iceland and an even higher number of shore protection projects. Through a number of breakwater projects, he has developed and introduced the Icelandic-type berm breakwater

In 2010 Sigurdarson established the IceBreak Consulting Engineers, which specialises in breakwaters and armourstone quarrying. An important factor in his professional development has been the cooperation with Prof. Jentsje W. van der Meer, that resulted in writing the book Design and Construction of Berm Breakwaters.

Moderator



Ir Professor Chan Pak Keung is an Honorary Fellow of the HK Chapter of the International Association for Hydro-environment Engineering & Research, an Adjunct Professor of the University of Hong Kong and the former Professor of Practice (Infrastructure), HK Polytechnic University. Being a former Assistant Director of the Drainage Services Department, he specialises in Flood Management & Wastewater Engineering

Organizer

LNS Ltd

Supporting Organisation

International Association for Hydro-Environment Engineering and Research - Hong Kong Chapter (IAHR-HK)



Date

25 Jan 2024

Time

2:30 p.m.-5:30 p.m.

Venue

Zoom platform

Working Language

English

Registration

Please send the registration form by email to: event@lns.com.hk

Early bird

28 December 2023

Application Deadline

11 Jan 2024

Payment Methods

Cheques should be made payable to

LNS Limited

Please send the cheque to the following address and indicate the name(s) of the participant(s) in the letter:

Room 1104, Crawford House,
70 Queen's Road Central, Central,
Hong Kong.

Enquiry

Tel: 2376 4964

Email: event@lns.com.hk

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by
Prof. Jentsje W. van der Meer
 &
Mr. Sigurdur Sigurdarson

Surname	(Mr / Ms)	
First Name		
Organisation/Company		
Position		
Correspondence Address		
Date of Course	25 Jan 2024	
CPD	3 Hours	
A group registrations of 18, Course Fee per head (registered on or before 28 December 2023)	HK\$1,900	
Early Bird Course Fee per head (registered on or before 28 December 2023)	HK\$2,300	
Course Fee per head	HK\$2,500	
Email Address		Tel:
Payment:	Bank Name:	Cheque No.:
		Amount \$:
Personal Data	<p>Reply slip from Personal Data Subject</p> <p>Yes, I (Name) _____ agree to give consent to LNS to use my personal data above to receive email from LNS regarding this course and marketing information of future events e.g. conference, training course, seminars, forums and site visits.</p> <p>No, I (Name) _____ do not want to receive any direct marketing information of LNS' s training course and events.</p> <p>Date _____</p>	

Terms of Conditions

1. Registration is on a first-come, first-served basis.
2. All cheques shall be crossed and made payable to the Organizer "LNS Limited" to confirm registration and are subject to bank clearance.
3. The registrant shall not cancel the registration three days after the submission of the registration form and/or after the confirmation of the course. The course fee shall be made payable by the registrant.
4. There is no refund for cancellation of booking initiated by applicant. However, the registration may be transferred to another person from the same company or organisation at no extra charge by notifying the Organizer at least 3 days prior to the commencement of the course.
5. The Organizer reserves the right to cancel the courses should there be insufficient applicants or for other reasons. Course fee will then be refunded 100%.
6. All applicants will be informed well in advance should there be any change of course dates due to unforeseen circumstances.
7. Applicants will be notified by email to confirm successful registrations. An official receipt will be provided after receiving payment.
8. Applicants are expected to attend the course at the place and time notified by the Organizer.
9. Before the course commences, if Typhoon Signal No.8 or above/Black Rainstorm Warning is in force; or Typhoon Signal No. 8 or above will be hoisted within 2 hours, the course will be cancelled. The course will be held as scheduled if Typhoon Signal No.8 or above/Black Rainstorm Warning is lowered at or before 7:00 am. The afternoon session of the course will be held as scheduled if Typhoon Signal No. 8 or above/Black Rainstorm Warning is lowered at or before 12:00 p.m.