



Name: Morten Kramer



PhD Thesis: Structural Stability of Low-crested Breakwaters. Aalborg : Department of Civil Engineering : Aalborg University, 2006. 174 pp. (DCE Thesis; 1)

Abstract: A more and more widespread way to protect the coast against ongoing erosion is to build so called Low Crested Structures (LCSs). Despite a large number of coast parallel LCSs exist, the structural performance of these structures are not fully clarified. The LCSs dealt with are coast parallel detached rubble mound structures, either emerging slightly above the water surface or somewhat submerged like a reef.

Initially results of a study of the geometry of existing LCSs are presented. The geometry and structural performance of existing LCSs form the basis of the limits for new design equations. New improved design formulae for calculation of static stability of LCSs are developed on the basis of new 2D and 3D laboratory experiments with scale models. The formulae are specially designed for breakwaters subject to shallow water waves and/or depth limited waves, as the majority of existing LCSs are exposed to such conditions. The formulae are validated against prototype experience. Ecological aspects in relation to structural stability are important, and design guidance on how to consider ecology in the design is therefore given. The new design guidance adds practical and helpful knowledge to the toolbox of the designing engineer.

Supervisor: Professor H.F. Burcharth

Opponents: Professor William Allsop and Professor Panayotis Prinos

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