

guide to concrete dike revetments

CENTRE FOR CIVIL ENGINEERING RESEARCH AND CODES
TECHNICAL ADVISORY COMMITTEE ON WATER DEFENCES



CONTENTS

LIST OF SYMBOLS	8
ABBREVIATIONS	9
Chapter 1 INTRODUCTION	11
Chapter 2 REVETMENT REQUIREMENTS TO BE MET	14
2.1 Functional requirements	14
2.2 Requirements for technical execution	14
2.3 Management and maintenance requirements	17
2.4 Special requirements	17
Chapter 3 REVETMENT TYPES	18
3.1 General	18
3.2 Main division	18
3.2.1 Shape of concrete elements	18
3.2.2 Degree of permeability of concrete revetments	21
3.2.3 Relationship between concrete block revetments and the permeability of the underlayer and intermediate layer	21
3.2.4 Prefabricated mats of concrete blocks on geotextile carriers	27
3.3 Subdivision	27
3.3.1 The possibility of mechanical placing	27
3.3.2 Reinforced or mass concrete	27
3.3.3 In-situ concrete or precast concrete	27
3.3.4 Above water or both above and below water construction	27
Chapter 4 CONCRETE TECHNOLOGY	28
4.1 General	28
4.2 Characteristics of wet concrete mixes and concrete	28
4.3 Requirements and regulations	28
4.4 Amplification	30
Chapter 5 REQUIREMENTS TO BE MET BY UNDERLAYERS	32
5.1 General	32
5.2 Watertight underlayers	32
5.3 Permeable underlayers	35
5.3.1 Underlayers of granular materials	35
5.3.2 Underlayers of bonded granular materials	37
5.4 Characteristics of materials	37
5.4.1 Clay	37

5.4.2	Colliery shale	38
5.4.3	Silex	39
5.4.4	Slag	40
5.4.5	Geotextile cloth or membrane	40
5.4.6	Sand asphalt, bitumenised sand	41
5.5	Filter characteristics	41
5.5.1	General	41
5.5.2	Types of filters	42
5.5.3	Sandtightness requirements	43
5.5.4	Other requirements	45
5.6	Quality control	46
Chapter 6	LOADING ZONES ON EMBANKMENTS	48
6.1	Sea walls	48
6.2	Embankments along lakes	50
6.3	River embankments	50
Chapter 7	EMBANKMENT PROFILE	52
7.1	Cross-section	52
7.2	Longitudinal profile	54
Chapter 8	BOUNDARIES AND TRANSITIONS	55
8.1	Toe construction of revetments	55
8.2	Top edge of the hard revetment	56
8.3	Transitions to other revetments	58
Chapter 9	CONSTRUCTION ASPECTS	62
9.1	General	62
9.2	Product	62
9.3	Storage and transport	62
9.4	Construction	63
Chapter 10	MANAGEMENT AND MAINTENANCE	64
10.1	Inspections	64
10.2	Maintenance	64
10.3	Repair feasibility	65
10.4	Reuse	65
Chapter 11	HYDRAULIC BOUNDARY CONDITIONS	66
11.1	General	66
11.2	Wave characteristics	67
11.2.1	Individual waves	67

11.2.2 Local characteristics of the individual wave field	70
11.3 Wave deformations	72
11.3.1 Wave deformations in front of embankments	72
11.3.2 Wave breaking on the dike slope	73
 Chapter 12 PARTICULAR LOADS	78
 Chapter 13 STABILITY OF THE HAND-SET BLOCK REVETMENT	80
13.1 General	80
13.2 Loose-lying elements	81
13.2.1 Permeable underlayer	81
13.2.2 Impermeable underlayer	87
13.3 Interlocked or friction block revetments (tightly fitting blocks)	88
13.4 Summary of the research in the “Delta flume”	88
 Chapter 14 SAFETY CONSIDERATIONS	93
14.1 General	93
14.2 Description of probabilistic methods	93
14.3 Load and strength	96
14.4 Safety level	98
 Chapter 15 SUMMARY	100
 REFERENCES	102