



CONTENTS

<i>Preface</i>	v
1. Introduction	1
1.1 General	1
1.2 Coal	2
1.3 Coal Ash Production	4
1.4 Handling and Disposal of Coal Ashes	5
1.5 Coal Ash Utilisation	8
1.6 Summary	9
2. Chemical Properties	10
2.1 Chemical Composition	10
2.2 X-ray Diffraction Spectra and Morphology	17
2.3 pH of Coal Ashes	21
2.4 Lime Reactivity	23
2.5 Cation Exchange Capacity	25
2.6 Summary	25
3. Physical Properties	26
3.1 Specific Gravity	26
3.2 Grain Size Distribution	32
3.3 Coal Ashes and Consistency Limits	38
3.3.1 General	38
3.3.2 K_0 -stress Method for Coal Ashes	39
3.4 Free Swell Index (FSI)	41
3.5 Specific Surface	42
3.6 Classification of Coal Ashes	44

3.6.1	General.....	44
3.6.2	Geotechnical Classification System for Coal Ashes	47
3.7	Summary	52
4.	Engineering Properties	54
4.1	Compaction Characteristics	54
4.1.1	Introduction	54
4.1.2	Compaction Curves of Coal Ashes	56
4.1.3	Effect of Delay Between Mixing and Compaction	67
4.2	Compressibility and Consolidation Characteristics	67
4.2.1	Introduction	67
4.2.2	Compressibility.....	69
4.2.3	Consolidation Characteristics	71
4.2.4	Secondary Consolidation	73
4.2.5	Collapse Behaviour	73
4.3	Permeability Characteristics	76
4.4	Strength Characteristics	79
4.4.1	General	79
4.4.2	Unconfined Compressive Strength	82
4.4.3	Shear Strength From Direct Shear Box Test	85
4.4.4	Shear Strength From Triaxial Shear Tests	89
4.4.5	Angle of Repose	91
4.5	California Bearing Ratio (CBR)	94
4.6	Dispersiveness	95
4.6.1	Double Hydrometer Test.....	96
4.6.2	Pin Hole Test	97
4.6.3	Turbidity Test	97
4.7	Leaching Behaviour	98
4.8	Summary	98
5.	Coal Ash/Soil Stabilisation	99
5.1	General	99
5.2	Fly Ash Stabilisation	100
5.2.1	Control of Unburned Carbon Content and Coarser Particles in Fly Ash.....	100
5.2.2	Lime/Cement Stabilisation of Coal Ashes	101
5.2.3	Fly Ash Stabilisation With Fine-grained Soil as an Admixture	102
5.3	Soil-Fly Ash Mixtures	105
5.3.1	Index Properties.....	105
5.3.2	Engineering Properties	105

5.4 Use of Fly ash in the Field 119

5.5 Summary 120

6. Concluding Remarks 121

6.1 The Positives 121

6.2 Limitations and the Remedy 124

6.3 The Need 126

References 127

Author Index..... 133

Subject Index..... 135