Contents

Abst	ract	i
Ackn	owledgments	iii
Cont	ents	v
List o	f Figures	vii
	f Tables	ix
List o	f Symbols	xi
List o	fAbbreviations	xiii
1	Introduction	1
1.1	Background	1
1.2	Objectives	4
1.3	Scope of Work	4
1.4	Outline of The Chapters	4
2	Literature Review on the Methodology	7
2.1	Background	7
2.2	Soil-Based Technologies in Local Communities	7
	2.2.1 Materials from Western Rajasthan Used in Construction	7
	2.2.2 Manufacturing of Off-White Cruse in Western Rajasthan	10
2.3	Application of Related Technologies for Clay Ceramic Water Filter Manufacture	11
2.4	Manufacturing of Green Composites	12
2.5	Manufacturing Methods of Traditional Ceramics	13
	2.5.1 Open Firing	13
	2.5.2 Wall Firing	14
	2.5.3 Pit Firing	14
26	2.5.4 Updraft Kiln Firing	15
2.6	Microstructural Characterization Techniques 2.6.1 Scanning Electron Microscopy (SEM)	17
	2.6.2 X-Ray Fluorescence Spectroscopy (XRF)	17 20
	2.6.3 Fourier Transform Infra-Red Spectroscopy (FTIR)	20
2.7	Mechanical Testing	21
2.7	2.7.1 Flexural Strength Test	22
	2.7.2 Compressive Strength Test	22
	2.7.3 Fracture Toughness Test	22
2.8	Statistical Analysis	23
	2.8.1 Statistical Variations Due to Manual Processing of Materials	23
	2.8.2 Important Probabilistic Methods and Models	23
	2.8.3 Multiple Regression Modeling	24
	2.8.4 Theoretical Development of Empirical Models	24
	2.8.5 Kolmogorov-Smirnov Test for Distribution	28
2.9	The Software Tools and Packages	28
	2.9.1 Minitab	28
	2.9.2 Origin	28
	2.9.3 CES Edu Pack	29
2.10	Surveys	29
3	Horse Dung and Soil-Based Composites for Construction of Aesthetic Shelves in Rural Ho	mes of
We	tern Rajasthan	31
3.1	Introduction	31
3.2	Experimental Methodology	32
	3.2.1 Selection of Raw Materials	32
	3.2.2 Raw Material Characterization	33
	3.2.3 Composite Processing	33
	3.2.4 Strength Tests of MM-EO Composites	34
3.3	Results and Discussions	35
	3.3.1 Water Characterization	35
	3.3.2 Characterizing MM, EO and MM-EO Composite	36

	75
	74
	72
	71
	71
	71
	69
	68
	66
	66
	65
	65
	63
	62
	61
	60
	59
	59
	59
	59
	58
	58
	58
	58
	58
	58
	56
	55
	54 55
	53
Jouripul City	53
Jodhpur City	50 57
	47
	45
	43
	40
	38