LIST OF FIGURES

Figure No.	Figure captions	Page No.
2.1	Phase diagram of CaO-Al ₂ O ₃ system.	11
3.1	Flow chart of high alumina cements powder preparation.	37
3.2	Low cement castable preparation.	40
3.3	DTA-TGA of alumina sulphate gel heated at the rate of 10° C/min up to 1300°C.	44
3.4	DTA-TGA of CaCO ₃ heated at the rate of 10°C/min up to 1300°C.	45
3.5	DTA-TGA of Composite heated at the rate of 10°C/min up to 1300°C.	46
3.6	XRD of HAC containing 70% Al ₂ O ₃ fired with varying range of temperature.	48
3.7	XRD of HAC containing 80% Al ₂ O ₃ fired with varying range of temperature.	49
3.8	Setting behavior of HAC.	50
3.9	Effect of curing period on CCS of HAC fired at 1350°C.	51
3.10	SEM of hydrated HAC containing 80% Al ₂ O ₃ with different magnifications. Figures with numbers 1, 2, 3 and 4 represent their magnifications, viz., 2500, 5000, 10000 and 20000×, respectively.	53
3.11	SEM of the LCC prepared by HAC containing 80% Al ₂ O ₃ with different magnifications. Figures with numbers a, b, c and d represent their magnifications, viz., 1000, 5000, 10000, and 20000×, respectively.	54
3.12	XRD of castables prepared by HAC containing 70% Al ₂ O ₃ .	55
3.13	XRD of castables prepared by HAC containing 80% Al ₂ O ₃ .	56

3.14	CCS of different castable compositions fired at 1400°C for	58
	3 h.	
4.1	Flow chart of HAC powder preparation.	64
4.2	Low cement castable preparation.	67
4.3	Bauxite particle size distribution.	69
4.4	XRD plot of HAC70.	72
4.5	XRD plot of HAC80.	73
4.6	Setting time behaviour of HAC70 and HAC80.	74
4.7	Cold crushing strength of HAC70 and HAC80.	75
4.8	FE-SEM of HAC70 with EDS pattern.	76
4.9	FE-SEM of HAC80 with EDS pattern.	77
4.10	XRD plot of R series castables prepared with HAC70.	78
4.11	XRD plot of S series castables prepared with HAC80.	79
4.12	Cold crushing strength of castables.	81
4.13	Cold modulus of rupture of castables.	82
4.14	Hot modulus of rupture of castables prepared with	83
	HAC80.	
4.15	Hot modulus of rupture of castables prepared with	83
	HAC70.	
4.16	FE-SEM with EDS pattern of S3 castable prepared with	85
	HAC80.	
5.1	Flow chart of HAC powder preparation.	92
5.2	Low cement castable preparation.	94
5.3	XRD plot of HAC70.	98
5.4	XRD plot of HAC80.	99
5.5	Setting time behaviour of HAC70 and HAC80.	100
5.6	Cold crushing strength of HAC70 and HAC80.	102
5.7	SEM of HAC70.	103

F 0		
5.9	XRD plot of P series castables prepared with HAC70.	105
5.10	XRD plot of Q series castables prepared with HAC80.	106
5.11	(a) Cold crushing strength of Q series of castables; (b)	109
	Cold crushing strength of P series of castables.	
5.12	(a) Cold modulus of rupture of Q series of castables; (b)	111
	Cold modulus of rupture of P series of castables.	
5.13	Hot modulus of rupture of castables prepared with	111
	HAC80.	
5.14	Hot modulus of rupture of castables prepared with	112
	HAC70.	
5.15	SEM of Q1 castable prepared with HAC80.	114
5.16	SEM of Q2 castable prepared with HAC80.	114
5.17	SEM of Q3 castable prepared with HAC80.	115
5.18	SEM of Q4 castable prepared with HAC80.	115
5.19	SEM of Q5 castable prepared with HAC80.	116
5.20	SEM of Q6 castable prepared with HAC80.	116
5.21	SEM of Q7 castable prepared with HAC80.	117
5.22	SEM of Q8 castable prepared with HAC80.	117
6.1	Flow chart of HAC powder preparation.	123
6.2	Bauxite particle size distribution.	126
6.3	Flow chart of low cement castable preparation.	126
6.4	XRD plot of pure milled HAC powder.	131
6.5	XRD plot of HAC70.	132
6.6	XRD plot of HAC80.	133
6.7	Setting time behaviour of HAC70 and HAC80.	134
6.8	Cold crushing strength of HAC70 and HAC80.	136
6.9	SEM of HAC70.	138

6.10	SEM of HAC80.	138
6.11	TEM of HAC80.	139
6.12	XRD plot of P series castables prepared with HAC70.	140
6.13	XRD plot of Q series castables prepared with HAC80.	141
6.14	(a) Cold crushing strength of Q series of castables; (b)	143
	Cold crushing strength of P series of castables.	
6.15	Compared cold crushing strength of Q6 and P6 castables.	144
6.16	Cold modulus of rupture of castables.	145
6.17	Hot modulus of rupture of castables prepared with	146
	HAC80.	
6.18	Hot modulus of rupture of castables prepared with	146
	HAC70.	
6.19	SEM of Q1 castable prepared with HAC80.	148
6.20	SEM of Q2 castable prepared with HAC80.	148
6.21	SEM of Q3 castable prepared with HAC80.	149
6.22	SEM of Q4 castable prepared with HAC80.	149
6.23	SEM of Q5 castable prepared with HAC80.	150
6.24	SEM of Q6 castable prepared with HAC80.	150
6.25	SEM of Q7 castable prepared with HAC80.	151
6.26	SEM of Q8 castable prepared with HAC80.	151