Appendix B – Tables :

Table B1 Fix method - British CP110:1972

Grade	Max agg. Size	40mm		20mm		14mm		10mm	
	Workability	Medium	High	Medium	High	Medium	High	Medium	High
	Slump (mm)	50-100	100-150	25-75	75-125	10-50	50-100	10-25	25-50
7	Cement (kg/m3) Agg. (kg/m3) % Fine agg.	180 1950 30-45	200 1850 30-45	210 1900 35-50	230 1800 35-50				
10	Cement (kg/m3) Agg. (kg/m3) % Fine agg	210 1900 30-45	230 1850 30-45	240 1850 35-50	260 1800 35-50				
15	Cement (kg/m3) Agg. (kg/m3) % Fine agg	250 1850 30-45	270 1800 30-45	280 1800 35-50	310 1750 35-50				
20	Cement (kg/m3) Agg. (kg/m3) % Fine agg - Zone 1 - Zone 2 - Zone 3	300 1850 35 30 30	320 1750 40 35 30	320 1800 40 35 30	350 1750 45 40 35	340 1750 45 40 35	380 1700 50 45 40	360 1750 50 45 40	410 1650 55 50 45

Table B1 Fix method - British CP110:1972 (CONT)									
25	Cement (kg/m^3) Agg. (kg/m^3) % Fine agg - Zone 1 - Zone 2 - Zone 3	340 1800 35 30 30	360 1750 40 35 30	360 1750 40 35 30	390 1700 45 40 35	380 1700 45 40 35	420 1650 50 45 40	400 1700 50 45 40	450 1600 55 50 45
30	Cement (kg/m^3) Agg. (kg/m^3) % Fine agg - Zone 1 - Zone 2 - Zone 3	370 1750 35 30 30	390 1700 40 35 30	400 1700 40 35 30	430 1650 45 40 35	430 1700 45 40 35	470 1600 50 45 40	460 1650 50 45 40	510 1550 55 50 45

Table B2 : Slump value for various applications

Type of construction	Slump	
	Maximum	Minimum
Reinforced concrete for foundation, wall	80	20
Foundation without reinforcement	80	20
Beam and reinforced wall	100	20
Column of building	100	20

Table B3 : Estimate water quantity

Slump (mm)	Water (kg/m3) for different aggregate			
	10mm	12.5mm	20mm	25mm
	40mm			
30-50	205	200	185	180
	160			
80-100	225	215	200	195
	175			
150-180	240	230	210	205
	185			
% air trap in non entrained concrete	3	2.5	2	1.5
	1			

Table B4 : W/c ratio vs. strength

Compressive strength at 28 days(MPa)	Water-cement ratio by weight (Non-air-entrained concrete)
44.1	0.38
39.2	0.43
34.3	0.48
29.4	0.55
24.5	0.62
19.6	0.70
14.7	0.80

Table B5 : Aggregate volume in a unit volume of concrete

Max. aggregate Size (mm)	Volume of dry aggregate in a unit volume of concrete of different fineness modulus			
	2.4	2.6	2.8	3
10	0.5	0.48	0.46	0.44
12.5	0.59	0.57	0.55	0.53
20	0.66	0.64	0.62	0.6
25	0.71	0.69	0.67	0.65
40	0.76	0.74	0.72	0.7

Table B6 : First estimate of new concrete weight

Max. aggregate Size (mm)	Concrete weight (kg/m3) (Non-air-entrained concrete)
10.5	2285
12.5	2315
20	2355
25	2375
40	2420

Table B7 Basic span-to-effective depth ratios

Support conditions	*Span-to-effective depth ratio*	
	Rectangular beam	*Flanged beams,* $b_w/b \leq 0.3$
Cantilever	7	5.6
Simply supported	20	16
Continuous	26	20.8

Table B8 Short-term modulus of elasticity of concrete

28 day characteristic cube strength $f_{cu,28}$ (N/mm²)	Static modulus $E_{c,28}$ (kN/mm²)	
	Typical range	Mean
25	19–31	25
30	20–32	26
40	22–34	28
50	24–36	30
60	26–38	32

Table B 9 Equations

$Ec = 33\ \gamma_c^{1.5}\sqrt{f'_c}$
$G = 250 * (2000 + f'_c)$
$G = E/2(1+\nu)$
$K = E/3(1-2\nu)$
$\gamma_c =$ Ib/ft³
$f'_c =$ psi

Appendix C – life photos :

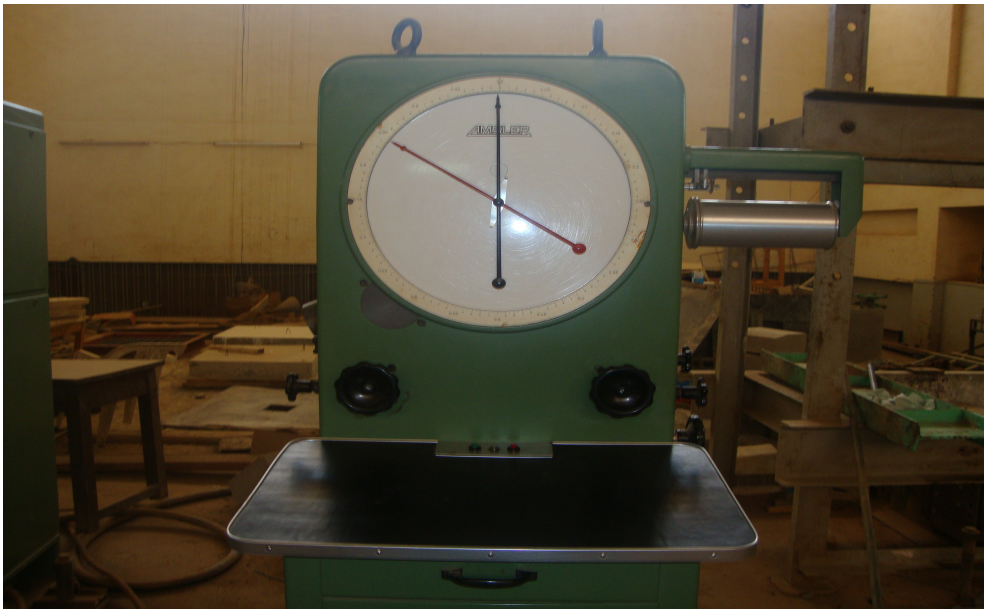
C1 - lab. Photo

C2 - lab. Photo

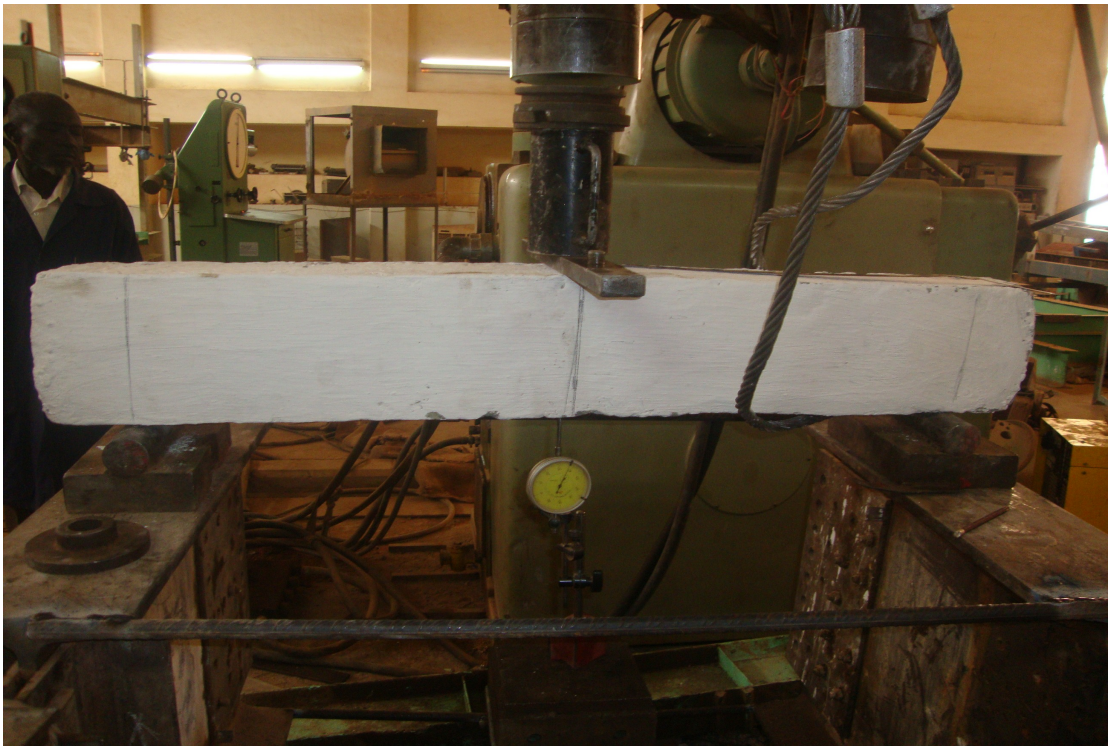
C3 - lab. Photo

C4 - Beams Photo

C5 - Beams Photo



C6 - Crushing Machine



C7 - Dialogues

C8 - First Cracking

C9 - Reading First Cracking

C10 - Failure Beams