

4.4 Comparisons between different results:

The comparison through Etabsprogramme and manual calculations results for design of twenty storeys building was made and put in table below

Table (4.6) comparison results (based on BS8110 code)

Building elements	Area of steel for manual design by BS-8110-1997	Area of steel for BS8110-1997 from Etabsprogramme	Area of steel for ACI-2005 from Etabsprogramme	Area of steel for EC2-1992 from Etabsprogramme	Manual design/BS 8110	ACI-2005/BS 8110	EC2-1992/ BS 8110
(1)flat slab							
For span (5m)							
column strip (top reinforcement)	2459mm ²	2631mm ²	2666 mm ²	2621 mm ²	0.93	1.01	1
column strip (bottom reinforcement)	1450mm ²	1463 mm ²	1463mm ²	1463 mm ²	0.99	1	1
middle strip (top reinforcement)	1463 mm ²	1463 mm ²	1463 mm ²	1463 mm ²	1	1	1
middle strip (bottom reinforcement)	1463mm ²	1463mm ²	1463 mm ²	1463mm ²	1	1	1
For span (7m)							
a-column strip (top	3940mm ²	3699mm ²	3777 mm ²	3700mm ²	1.07	1.02	1

reinforcement)							
column strip (bottom reinforcement)	2267mm ²	2033mm ²	2061mm ²	2026 mm ²	1.12	1.01	1
middle strip (top reinforcement)	1166mm ²	1789mm ²	1813 mm ²	1781 mm ²	0.65	1.02	1
middle strip (bottom reinforcement)	1861mm ²	1852mm ²	1877 mm ²	1845mm ²	1	1.01	1
2-columns							
a-internal columns							
(i)from storey20to storey16	8T16mm	8T25mm	10T25mm	8T25mm	0.41	1.33	1
(ii) from storey 15to storey11	18T25mm	18T25mm	18T25mm	18T25mm	1	1	1
(iii) from storey 10to storey6	20T32mm	18T32mm	18T32mm	18T32mm	1.1	1	1
(iv) from storey 5to storey1	24T32mm	22T32mm	22T32mm	22T32mm	1.1	1	1

b- corner and edge columns							
(i)from storey20to storey16	8 T16mm	4T6mm	4T16mm	4T16mm	2	1	1
(ii) from storey15to storey11	8T16mm	6Ø16mm	6T16mm	6T16mm	1.3	1	1
(iii) from storey10to storey6	8T20mm	6T16mm	6T16mm	6T16mm	2	1	1
(iv) from storey5to storey1	8T20mm	6T16mm	6T16mm	6T16mm	2	1	1
4-shearwall	Ø20mm@15cm c/c	Ø16mm@15cm c/c	Ø12mm@15cm c/c	Ø12mm@15cm c/c			
	Ø16mm@20cm c/c	Ø12mm@15cm c/c	Ø12mm@15cm c/c	Ø12mm@15cm c/c	1.33	0.75	0.75
5- Raft foundation							
For span (5m)							
a-column strip (top reinforcement)	5530mm ²	6704mm ²	7014mm ²	6954mm ²	0.82	1.05	1.04
b-column strip (bottom	3537mm ²	6254mm ²	6800mm ²	6744mm ²	0.57	1.09	1.08

reinforcement)							
c-middle strip (top reinforcement)	1843mm ²	2911mm ²	2303mm ²	2807mm ²	0.63	0.79	0.96
d-middle strip (bottom reinforcement)	2894mm ²	4617mm ²	4826mm ²	4786mm ²	0.63	1.05	1.04
For span (7m)							
a-column strip (top reinforcement)	7936mm ²	7943mm ²	8213mm ²	7786mm ²	1	1.03	0.98
b-column strip (bottom reinforcement)	5292mm ²	5849mm ²	6162mm ²	6109mm ²	0.9	1.05	1.04
c-middle strip (top reinforcement)	2646mm ²	2616mm ²	1720mm ²	3067mm ²	1.01	0.66	1.17
d-middle strip (bottom reinforcement)	4153mm ²	4918mm ²	5523mm ²	5492mm ²	0.84	1.12	1.12