Concrete mix design form

Job title ....

Stage	Item		Reference or calculation	Values
1	1.1	Characteristic strength	Specified	.... N/mm² at .... days
				Proportion defective .... %
	1.2	Standard deviation	Fig 3	.... N/mm² or no data .... N/mm²
	1.3	Margin	C1 or Specified	(k = ...) .... × .... = ... N/mm²
				.... N/mm²
	1.4	Target mean strength	C2	.... + ... = ... N/mm²
	1.5	Cement strength class	Specified	42.5/52.5
	1.6	Aggregate type: coarse Aggregate type: fine		Crushed/uncrushed Crushed/uncrushed
	1.7	Free-water/cement ratio	Table 2, Fig 4	.... } Use the lower value [ ]
	1.8	*Maximum free-water/ cement ratio*	Specified	....
2	2.1	Slump or Vebe time	Specified	Slump .... mm or Vebe time .... s
	2.2	Maximum aggregate size	Specified	.... mm
	2.3	Free-water content	Table 3	.... [kg/m³]
3	3.1	Cement content	C3	.... ÷ .... = ... kg/m³
	3.2	*Maximum cement content*	Specified	.... kg/m³
	3.3	*Minimum cement content*	Specified	.... kg/m³
				use 3.1 if ≤ 3.2 use 3.3 if > 3.1 [kg/m³]
	3.4	*Modified free-water/cement ratio*		.... [ ]
4	4.1	Relative density of aggregate (SSD)		.... known/assumed
	4.2	Concrete density	Fig 5	.... kg/m³
	4.3	Total aggregate content	C4	.... − .... − .... = ... kg/m³
5	5.1	Grading of fine aggregate	Percentage passing 600 μm sieve	.... %
	5.2	Proportion of fine aggregate	Fig 6	.... %
	5.3	Fine aggregate content	C5	.... × .... = [kg/m³]
	5.4	Coarse aggregate content		.... − .... = [kg/m³]

Quantities	Cement (kg)	Water (kg or litres)	Fine aggregate (kg)	Coarse aggregate (kg)		
				10 mm	20 mm	40 mm
per m³ (to nearest 5 kg)	....	....	....	....	....	....
per trial mix of .... m³	....	....	....	....	....	....

Items in italics are optional limiting values that may be specified (see Section 7).

Concrete strength is expressed in the units N/mm². 1 N/mm² = 1 MN/m² = 1 MPa. (N = newton; Pa = pascal.)

The internationally known term 'relative density' used here is synonymous with 'specific gravity' and is the ratio of the mass of a given volume of substance to the mass of an equal volume of water.

SSD = based on the saturated surface-dry condition.

Table 2. Approximate compressive strengths (N/mm^2) of concrete mixes made with a free-water/cement ratio of 0.5

Cement Strength Class	Type of Coarse aggregate	Compressive strengths (N/mm^2) (age in days)			
		3	7	28	91
42.5	Uncrushed	22	30	42	49
	Crushed	27	36	49	56
52.5	Uncrushed	29	37	48	54
	Crushed	34	43	55	61

1 N/mm^2 = 1 MN/mm^2 = 1 MPa

Table 3 Approximate free-water contents (kg/m^3) required to give various levels of workability

Slump (mm)		0-10	10-30	30-60	60-180
V-B (s)		>12	6-12	3-6	0-3
Maximum size of aggregate(mm)	Type of aggregate				
10	Uncrushed	150	180	205	225
	Crushed	180	205	230	250
20	Uncrushed	135	160	180	195
	Crushed	170	190	210	225
40	Uncrushed	115	140	160	175
	Crushed	155	175	190	205

Note: When coarse and fine aggregates of different types are used, the free-water content is estimated by the expression

$$\frac{2}{3} W_f + \frac{1}{3} W_c$$

where W_f = free-water content appropriate to type of fine aggregate

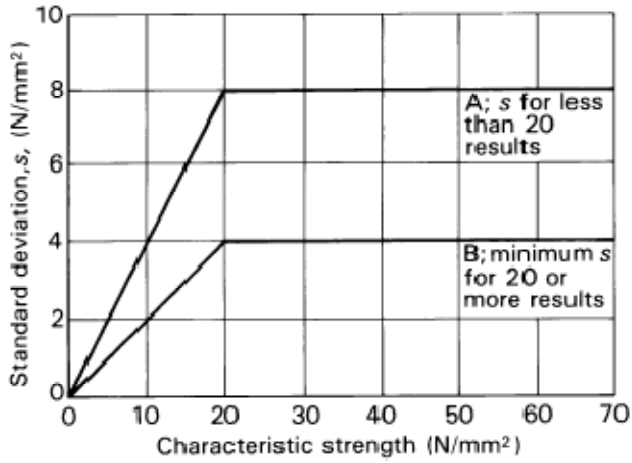and W_c = free-water content appropriate to type of coarse aggregate.

Figure 3
Relationship between standard deviation and characteristic strength
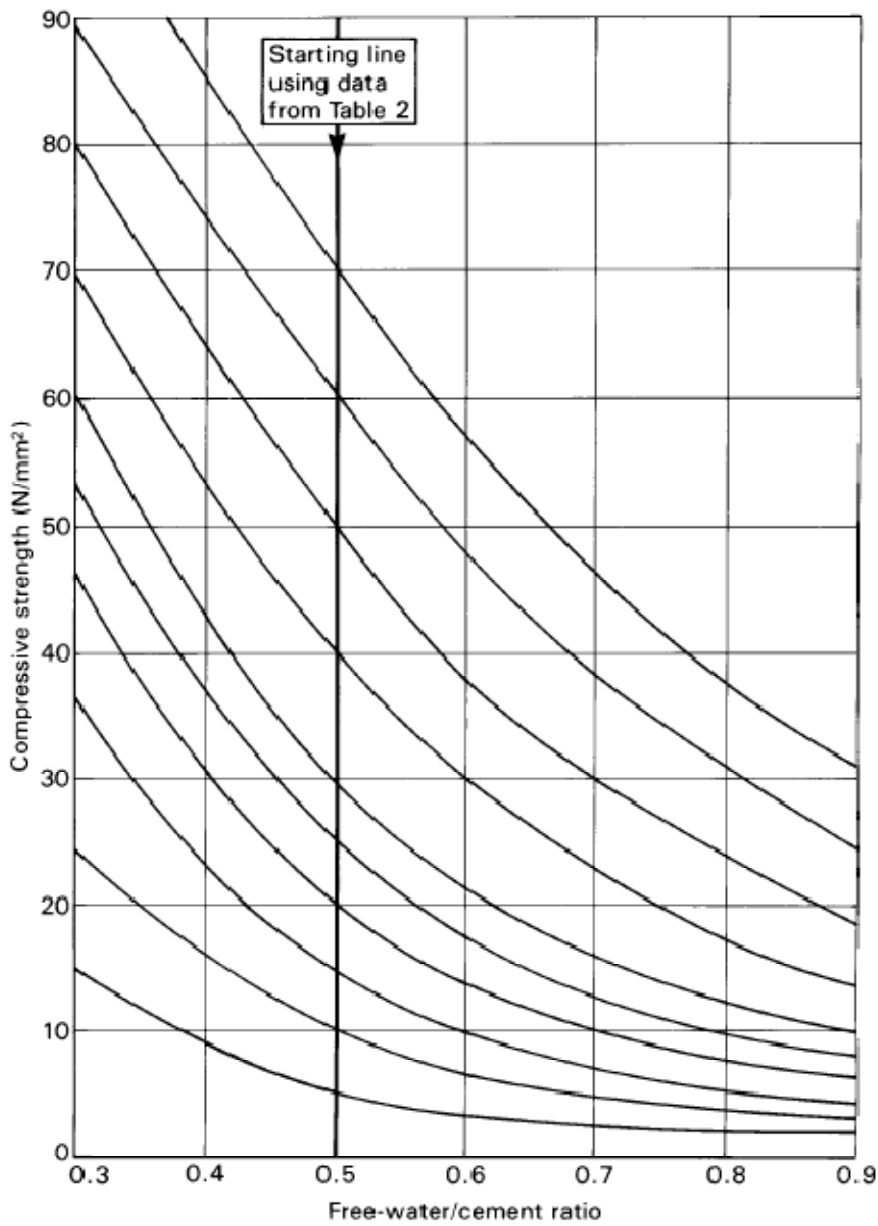

Figure 4
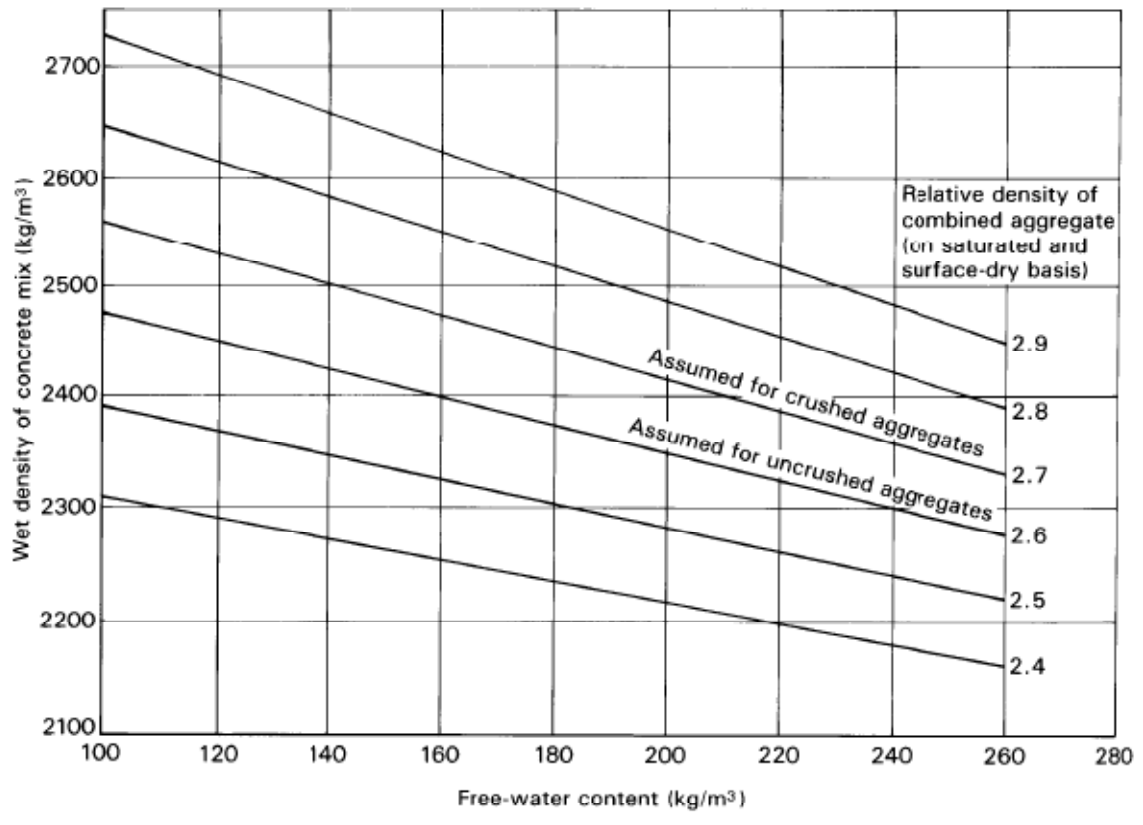Relationship between compressive strength and free-water/cement ratio

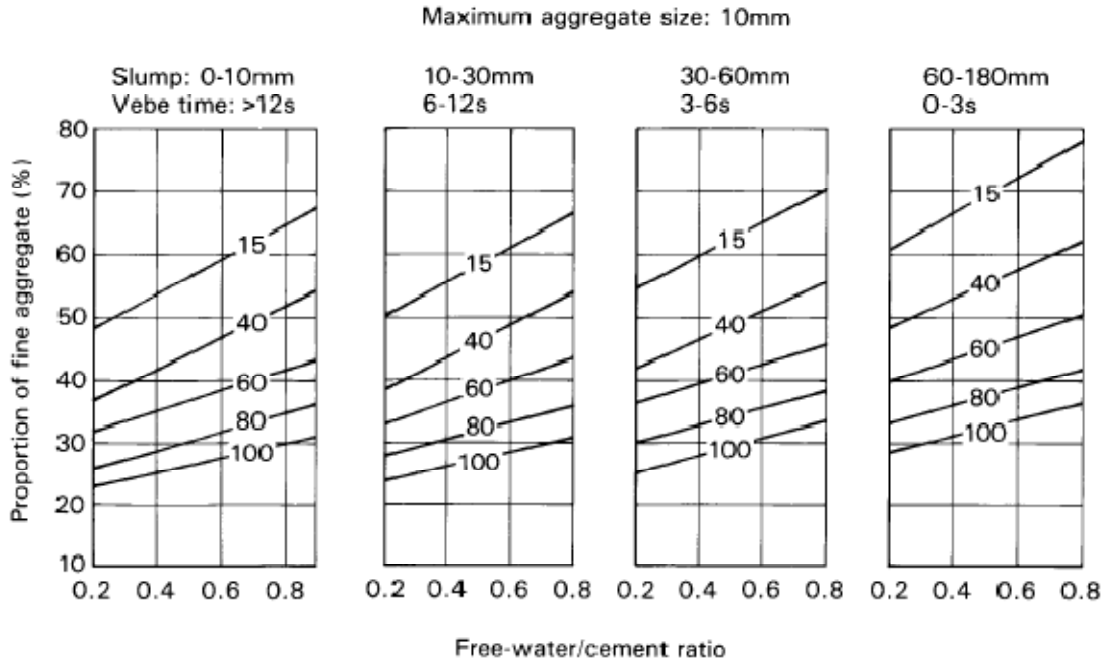Figure 5   Estimated wet density of fully compacted concrete

Maximum aggregate size: 10mm

Figure 6   Recommended proportions of fine aggregate according to percentage passing a 600 μm sieve
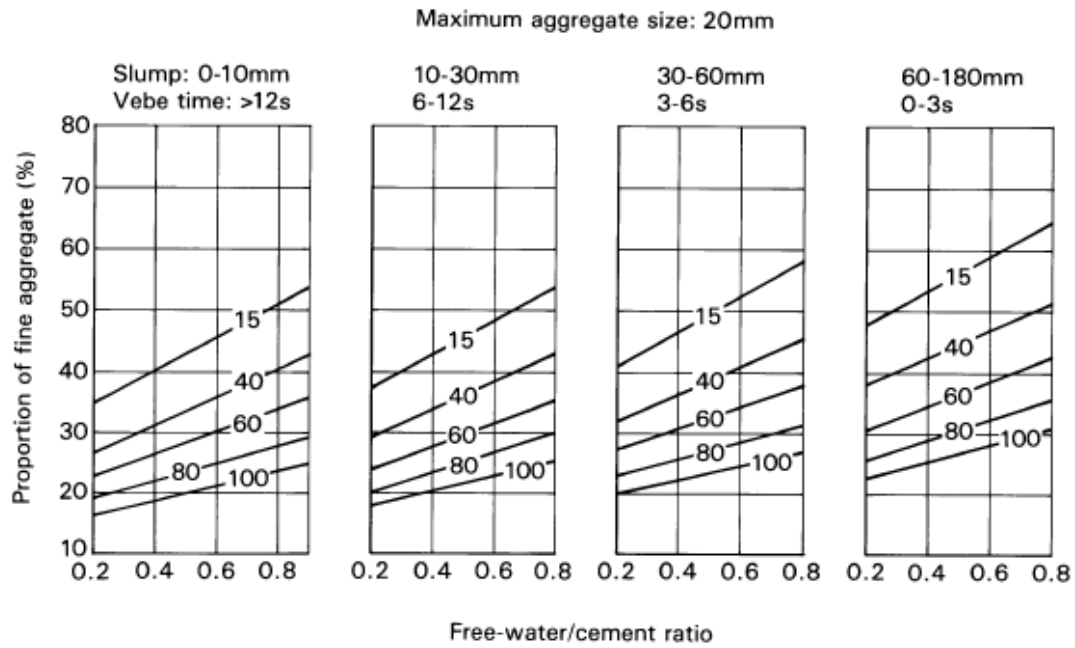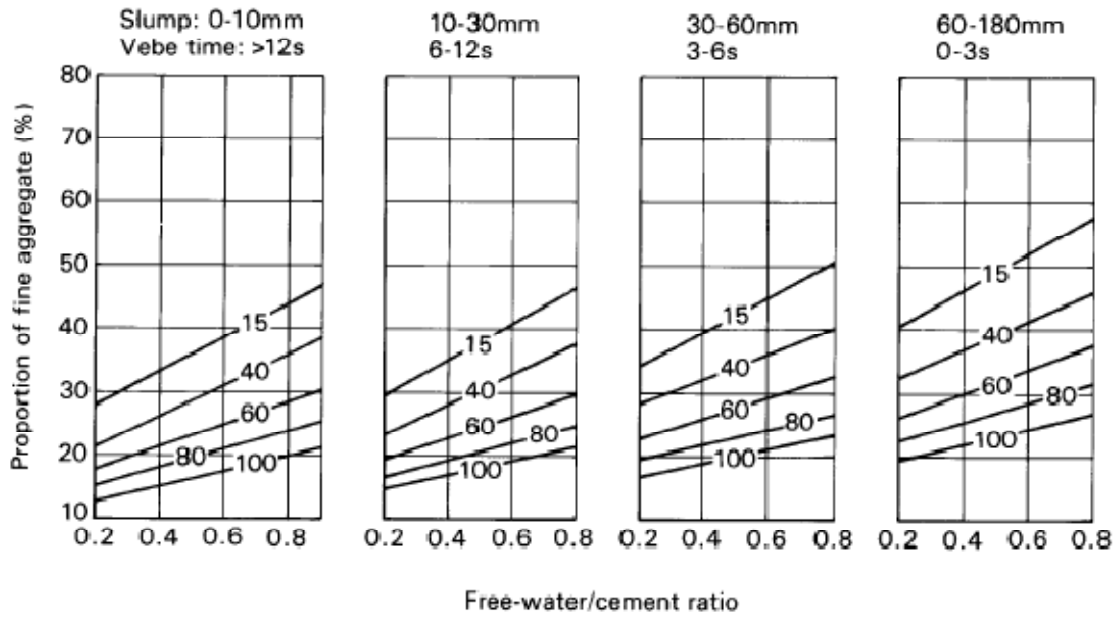
Maximum aggregate size: 20mm

Figure 6   (continued)

Maximum aggregate size: 40mm

Figure 6   (continued)