



AIR ENTRAINMENT OF CONCRETE

Effects

- 1 The increase of air decreases the strength of concrete if there is no other change in mix proportions. the decrease of strength is proportional to the air content up to a level of 8%, eg

Air content - %	Decrease in strength - %
0	0
2	10
4	21
6	31
8	42

- 2 It has a beneficial effect on workability. (The spherical bubbles act as fine aggregate of very low surface friction and high compressibility).
- 3 For constant workability, the addition of entrained air can be accompanied by reduction in the W/C ratio and thus compensating for the loss of strength.
- 4 The net loss of strength of a richer mix is higher than that of the leaner mix, because in the former the effect of air entrainment on improving workability is smaller.
- 5 In the case of mass concrete, where the development of heat of hydration and not the strength, is of primary importance, air entrainment permits the use of lower cement contents and leads therefore to a lower temperature rise.
- 6 The presence of entrained air is also beneficial in reducing bleeding: the air bubbles keep the solid particles in suspension so that sedimentation is reduced and water is not expelled.
- 7 For the reasons in 6 above, the formation of laitance is reduced which results in improved frost resistance for exposed concrete.
- 8 Segregation is reduced provided the concrete is not over vibrated.
- 9 Entrained air lowers slightly the density, which offers an economic advantage since the materials "go further".