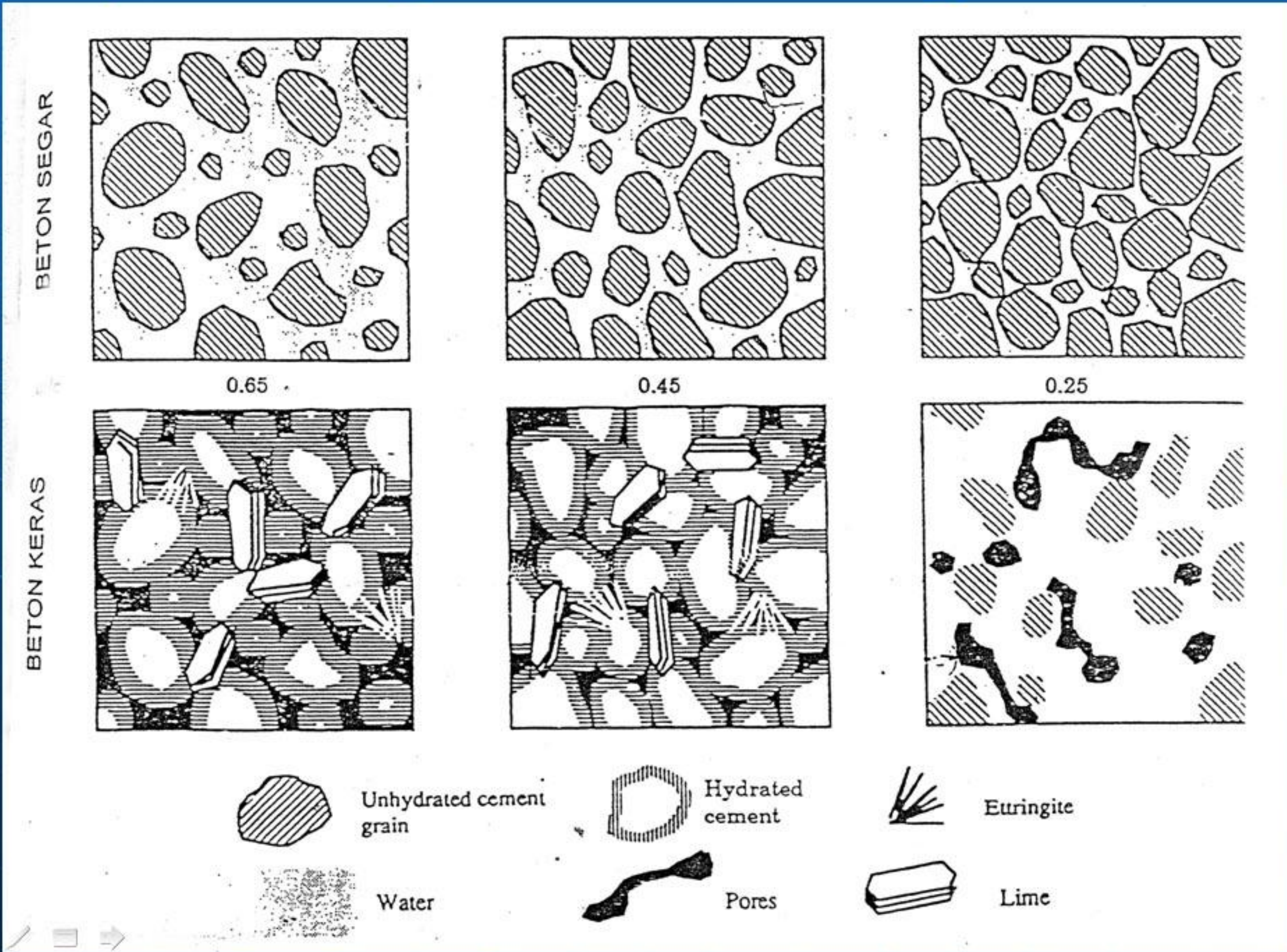
TEKNOLOGI BETON LANJUT

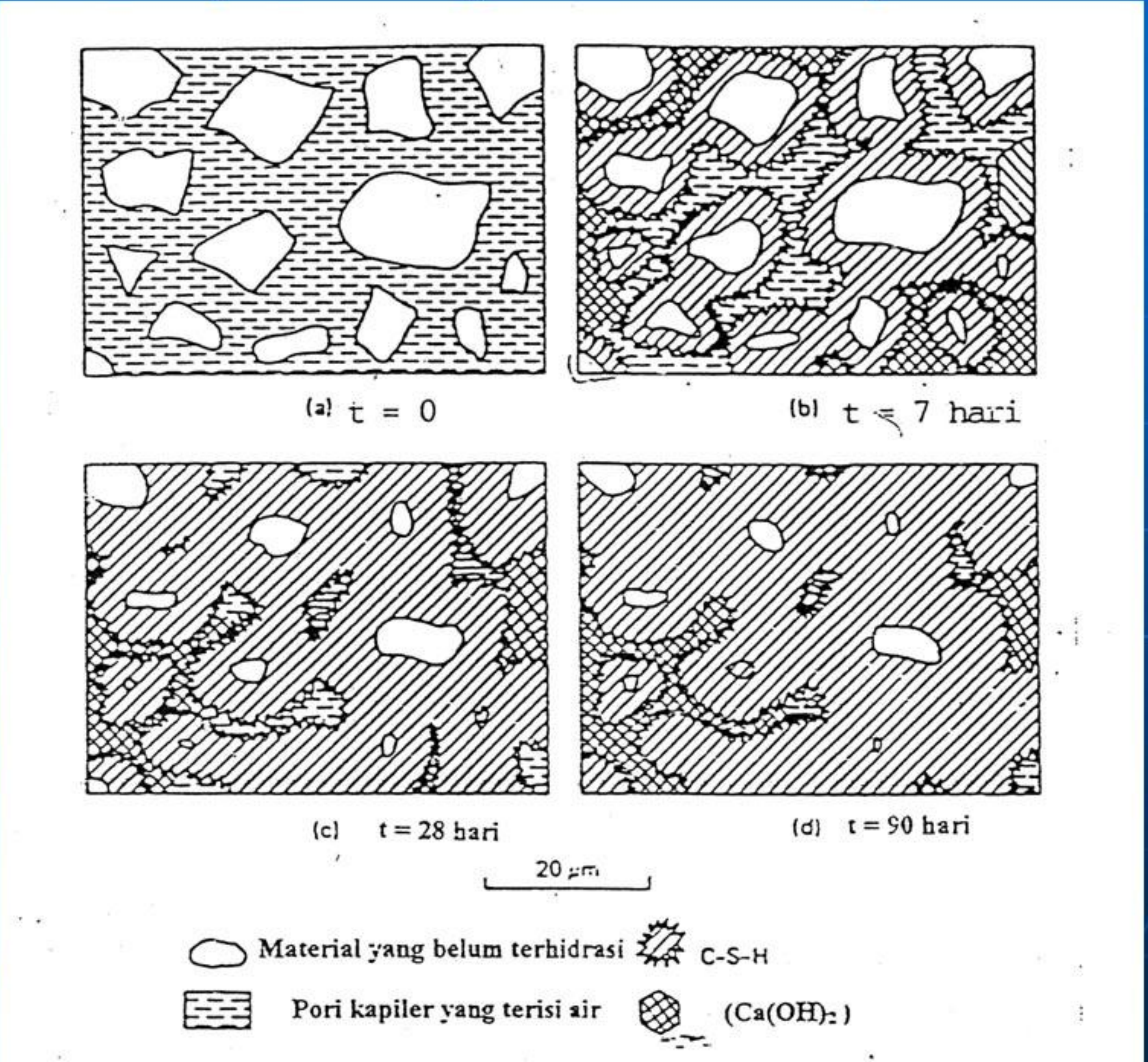
Faktor-faktor yang mempengaruhi kekuatan beton adalah :

- Tingkat hidrasi
- Densitas beton (W/C ratio)
- Tipe kandungan semen
- Penggunaan bahan tambahan kimiawi atau mineral
- Suhu dan kelembaban selama perawatan
- Sifat sifat dan mekanik agregat
- Kebersihan agregat
- Proporsi campuran
- Pemadatan

Gambar 2
Komposisi beton segar dan keras untuk berbagai rasio air-semen



Gambar 3
Ilustrasi perkembangan mikrostruktur pasta semen



Kuat tekan:

Figure 3-2 Typical failure mode of concrete in compression.

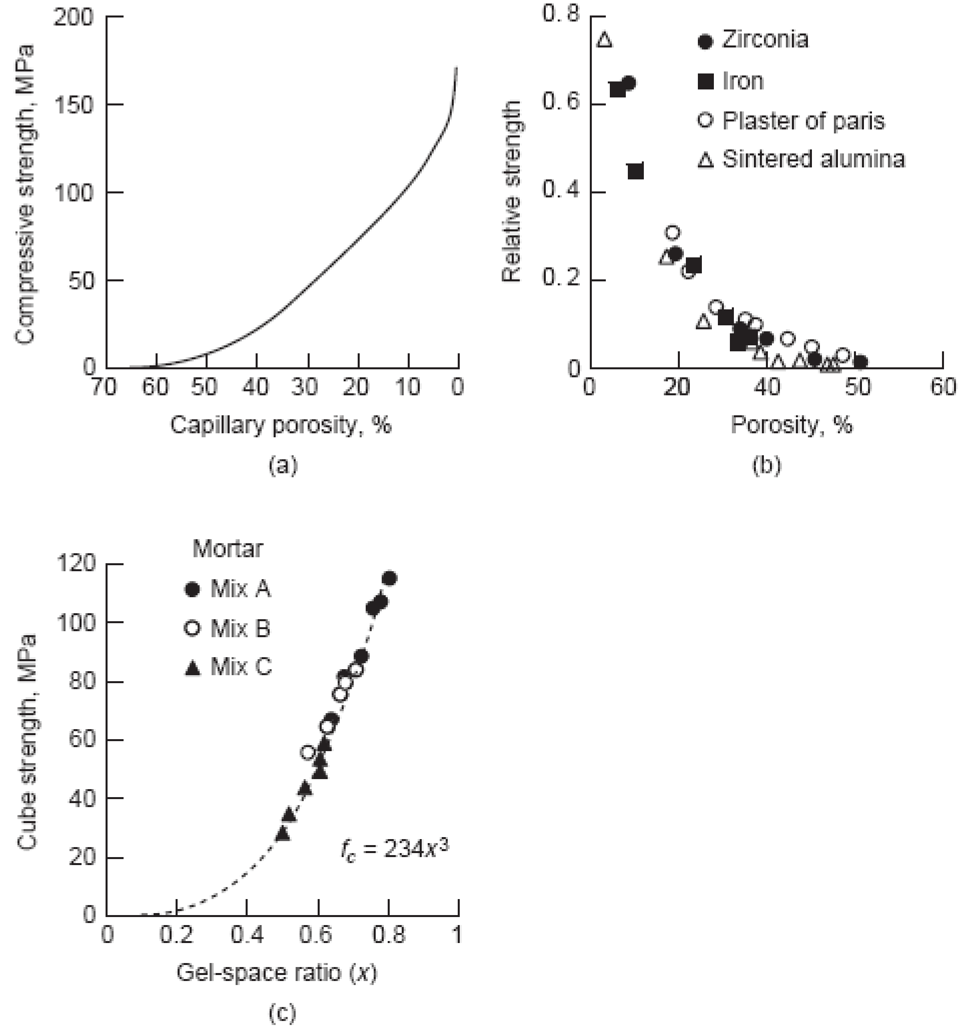


Figure 3-1 Porosity-strength relation in solids: (*a*) normally cured cements, autoclaved cements, and aggregates; (*b*) iron, plaster of Paris, sintered alumina, and zirconia; (*c*) portland cement mortars with different mix proportions. [(*a*) From Verbeck, G.J., and R.A. Helmuth, *Proceedings of Fifth International Symposium on Chemistry of Cements*, Tokyo, Vol. 3, pp.1–32, 1968; (*b*) from Neville, A.M., *Properties of Concrete*, Pitman Publishing, Marshfield, MA, p. 271, 1981; (*c*) from Powers, T.C., *J. Am. Ceram. Soc.*, Vol. 41, No.1, pp. 1–6, 1958.]

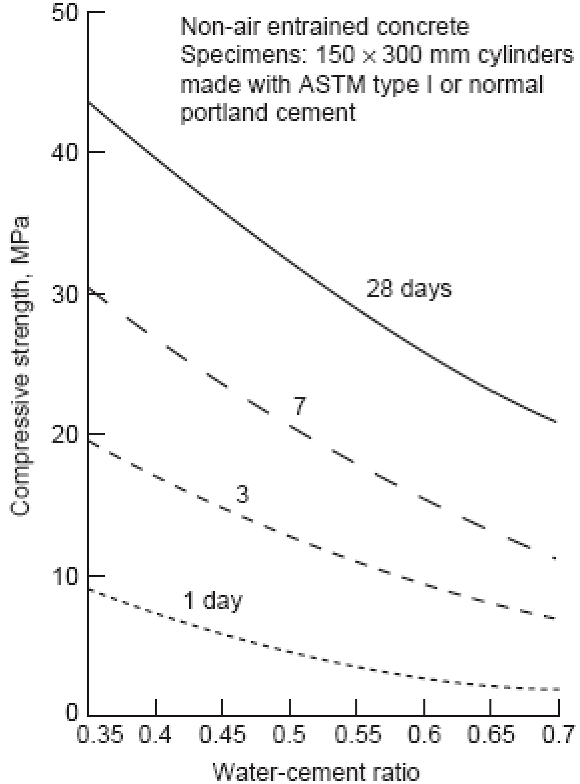
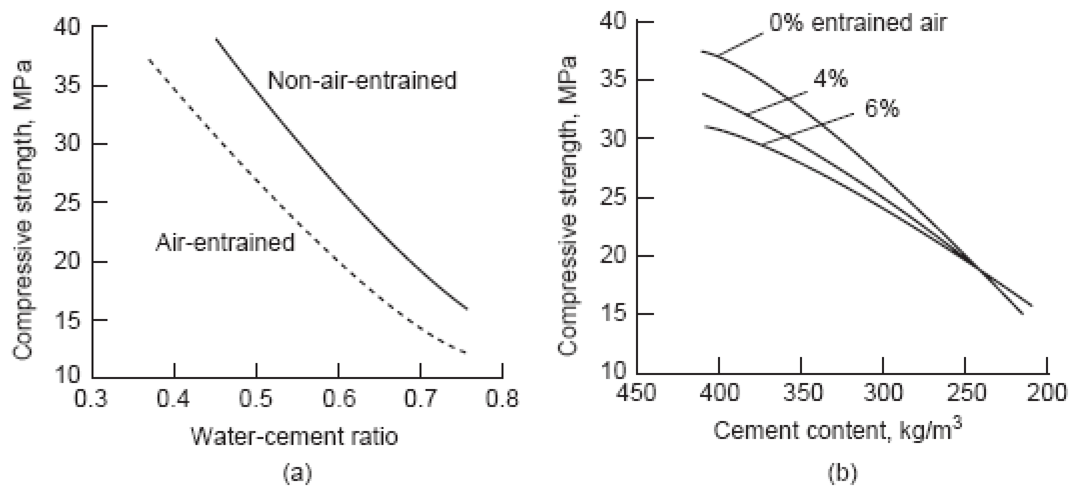


Figure 3-3 Influence of the water-cement ratio and moist curing age on concrete strength. (From *Design and Control of Concrete Mixtures*, 13th ed., Portland Cement Association, Skokie, III., p. 6, 1988.)



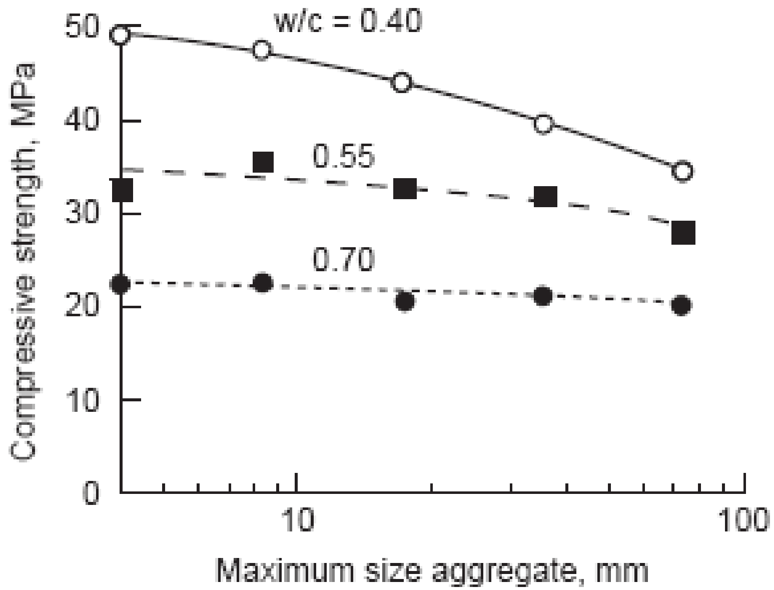
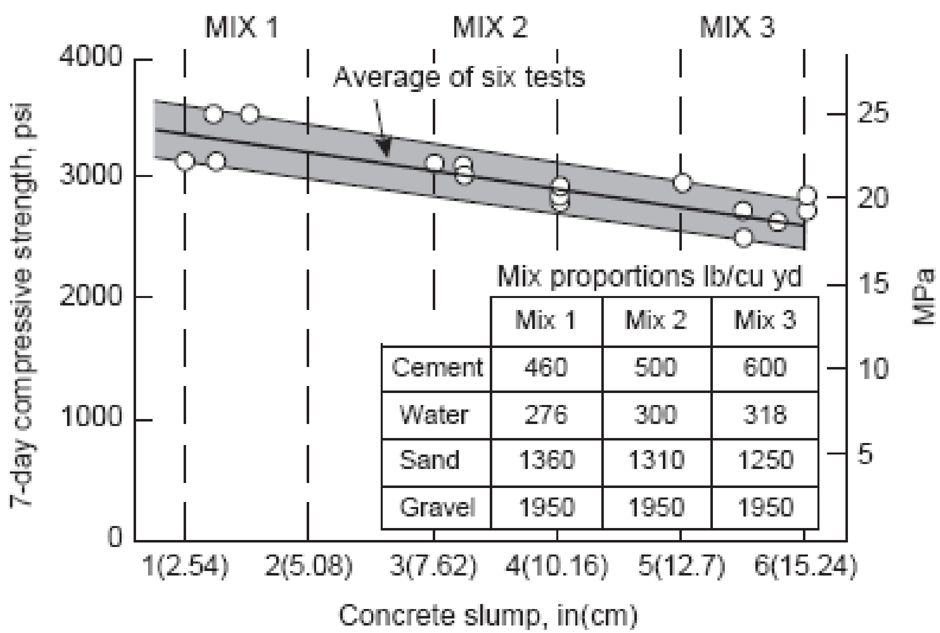
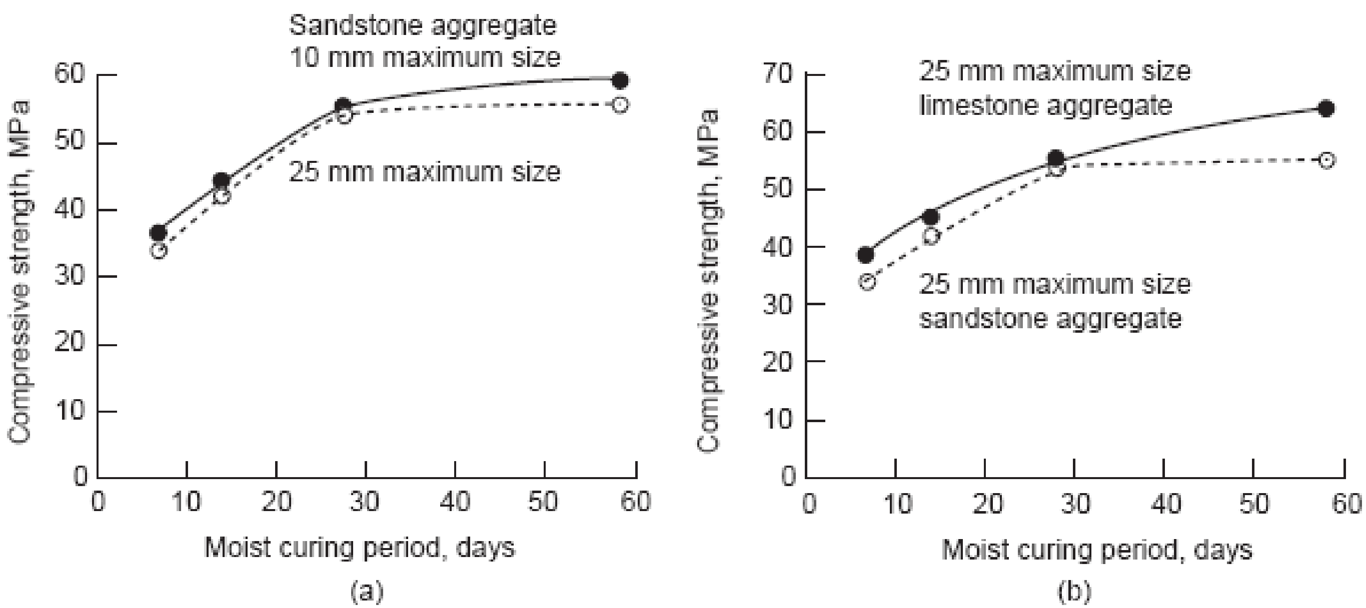


Figure 3-5 Influence of the aggregate size and the water-cement ratio on concrete strength. (From Cordon, W.A., and H.A. Gillespie, *J. ACI, Proc.*, Vol. 60, No. 8, 1963.)



	Mix 1	Mix 2	Mix 3
Cement	460	500	600
Water	276	300	318
Sand	1360	1310	1250
Gravel	1950	1950	1950



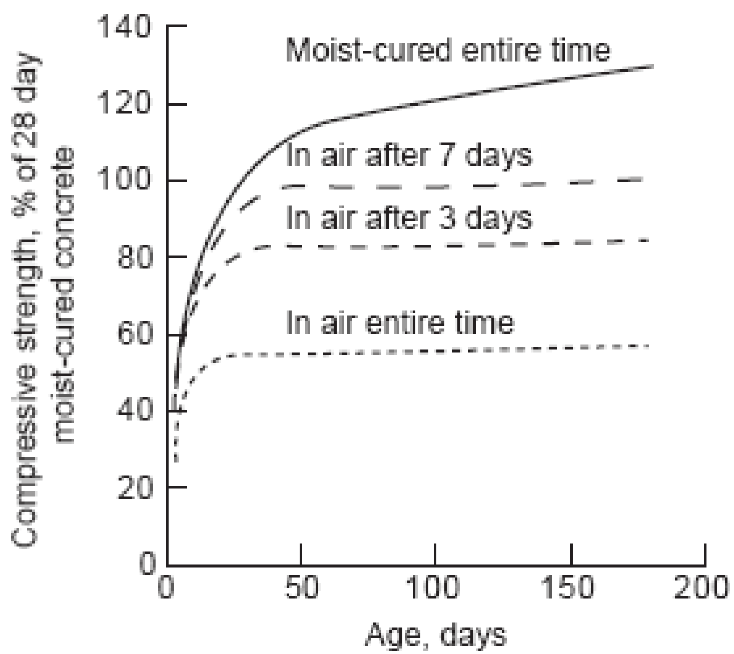


Figure 3-8 Influence of curing conditions on strength. (From *Concrete Manual*, 8th ed., U.S. Bureau of Reclamation, 1981.)

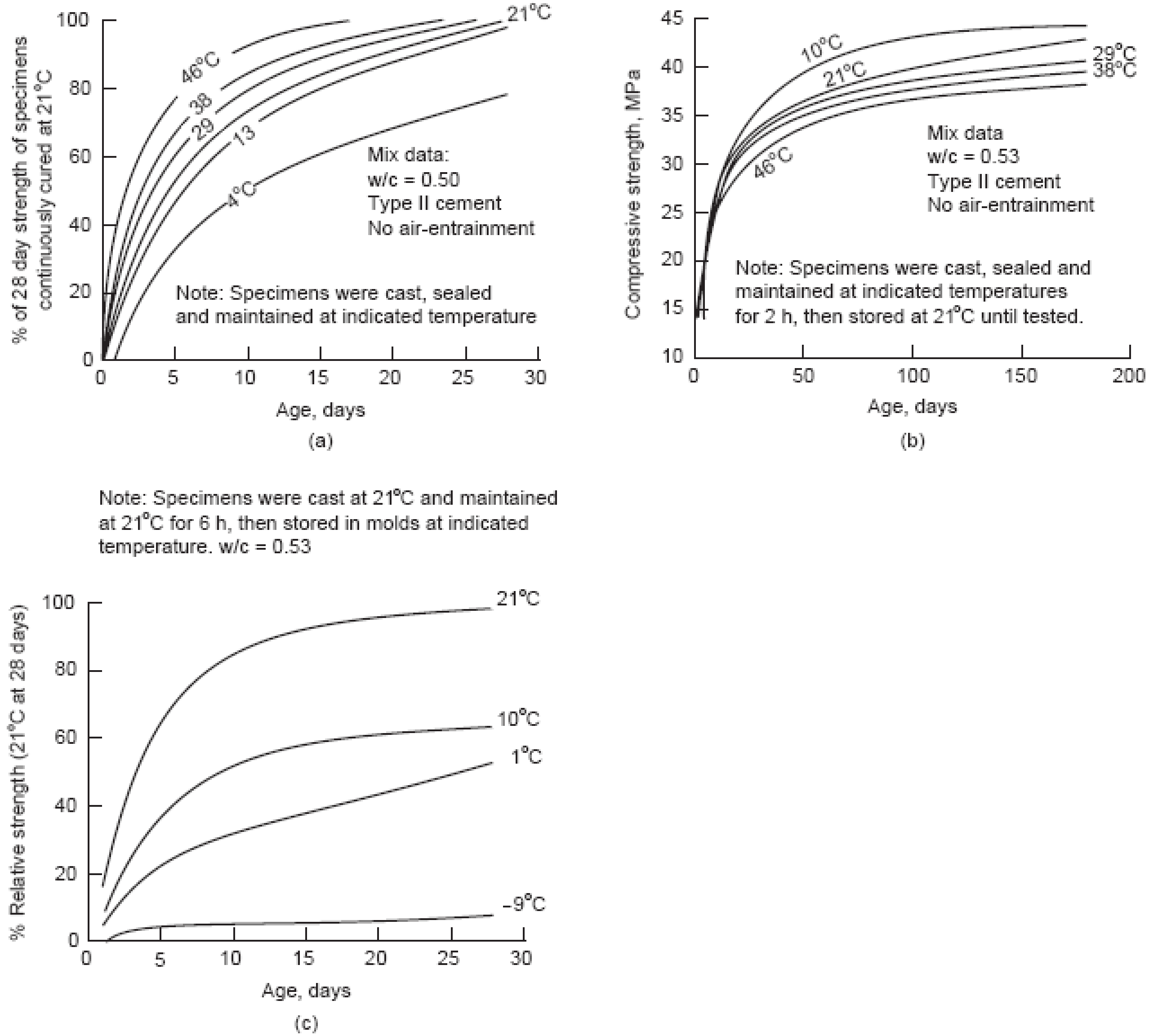


Figure 3-9 Influence of casting and curing temperatures on concrete strength. (From *Concrete Manual*, U.S. Bureau of Reclamation, 1975.)

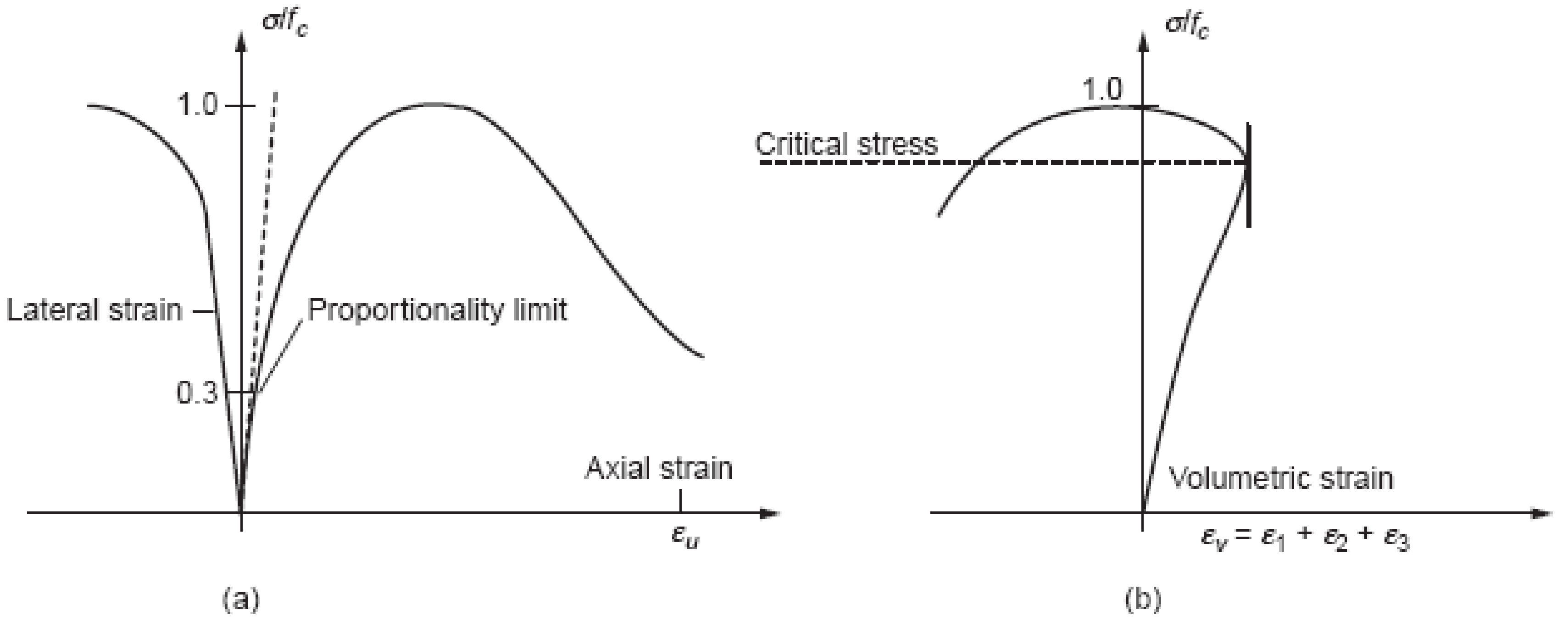


Figure 3-13 Typical plots of compressive stress vs. (*a*) axial and lateral strains, and (*b*) volumetric strains. (From Chen, W.F., *Plasticity in Reinforced Concrete*, McGraw-Hill,, New York, p. 20, 1982.)

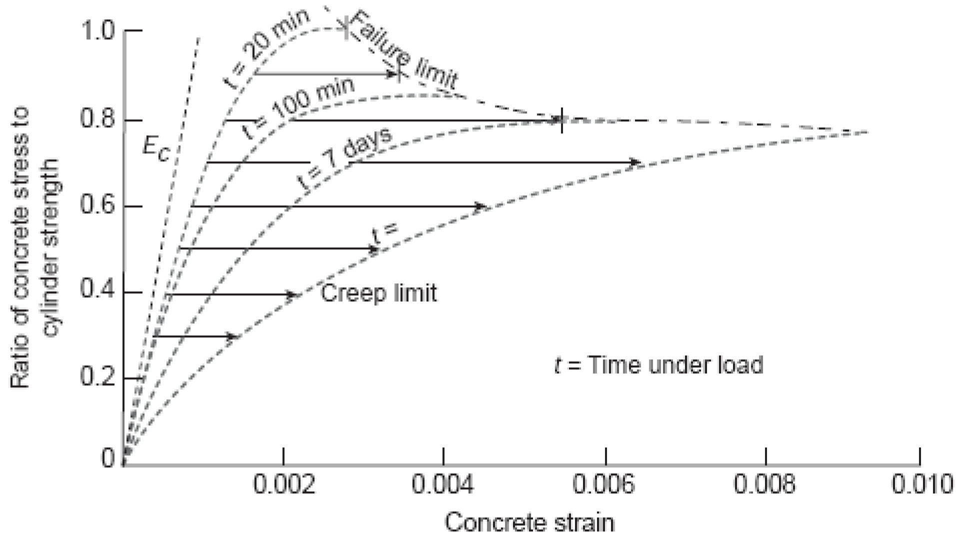
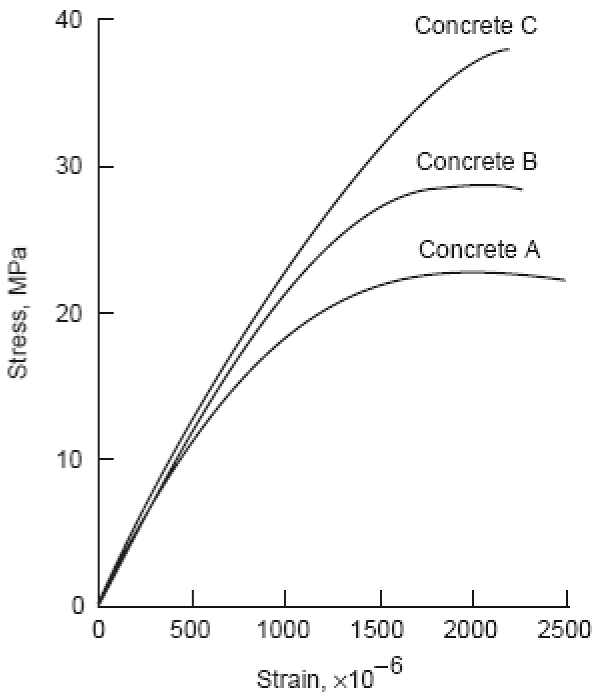


Figure 3-14 Relationship between the short-term and long-term loading strengths. (From Rusch, H., *J. ACI, Proc.*, Vol. 57, No. 1, 1960.)



Mix Proportions and Properties of Non-Air-Entrained Concrete*

Mix No. →	A	B	C
Water-cement ratio	0.68	0.57	0.48
Slump, mm	165	180	170
f'_c, MPa	22.4	29.0	40.0
f'_{st}, MPa	2.6	2.9	3.5
f'_{st}/f'_c	0.11	0.10	0.09

*Unpublished data from students experiments, University of California at Berkeley.

Figure 3-17 Influence of the water-cement ratio on tensile and compressive strengths.

Kuat tarik:

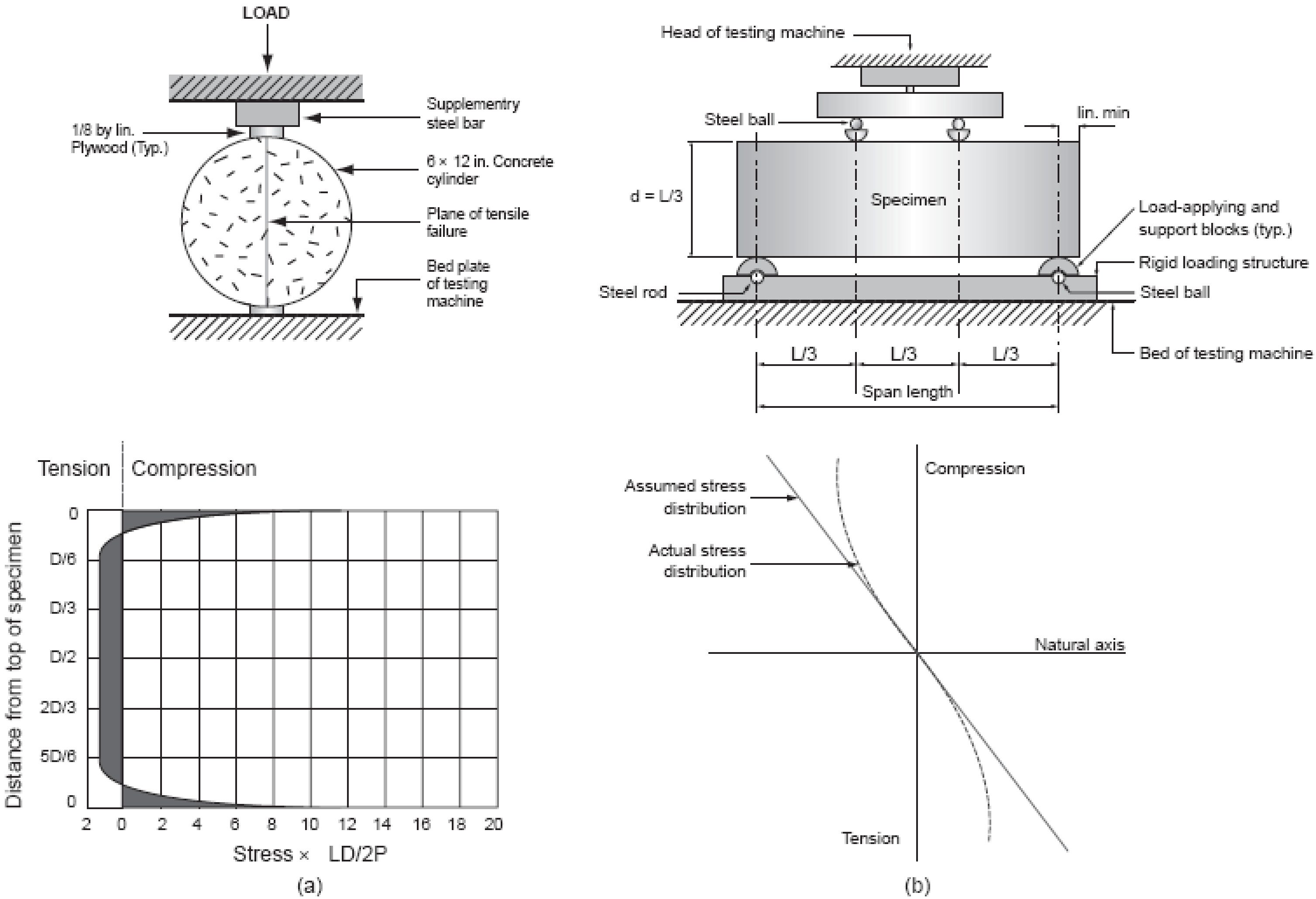


Figure 3-16 (*a*) Splitting tension test (ASTM C 496): top, diagrammatic arrangement of the test; bottom, stress distribution across the loaded diameter of a cylinder compressed between two plates. (*b*) Flexural test by third-point loading (ASTC C 78): top, diagrammatic arrangement of the test; bottom, stress distribution across the depth of a concrete beam under flexure.

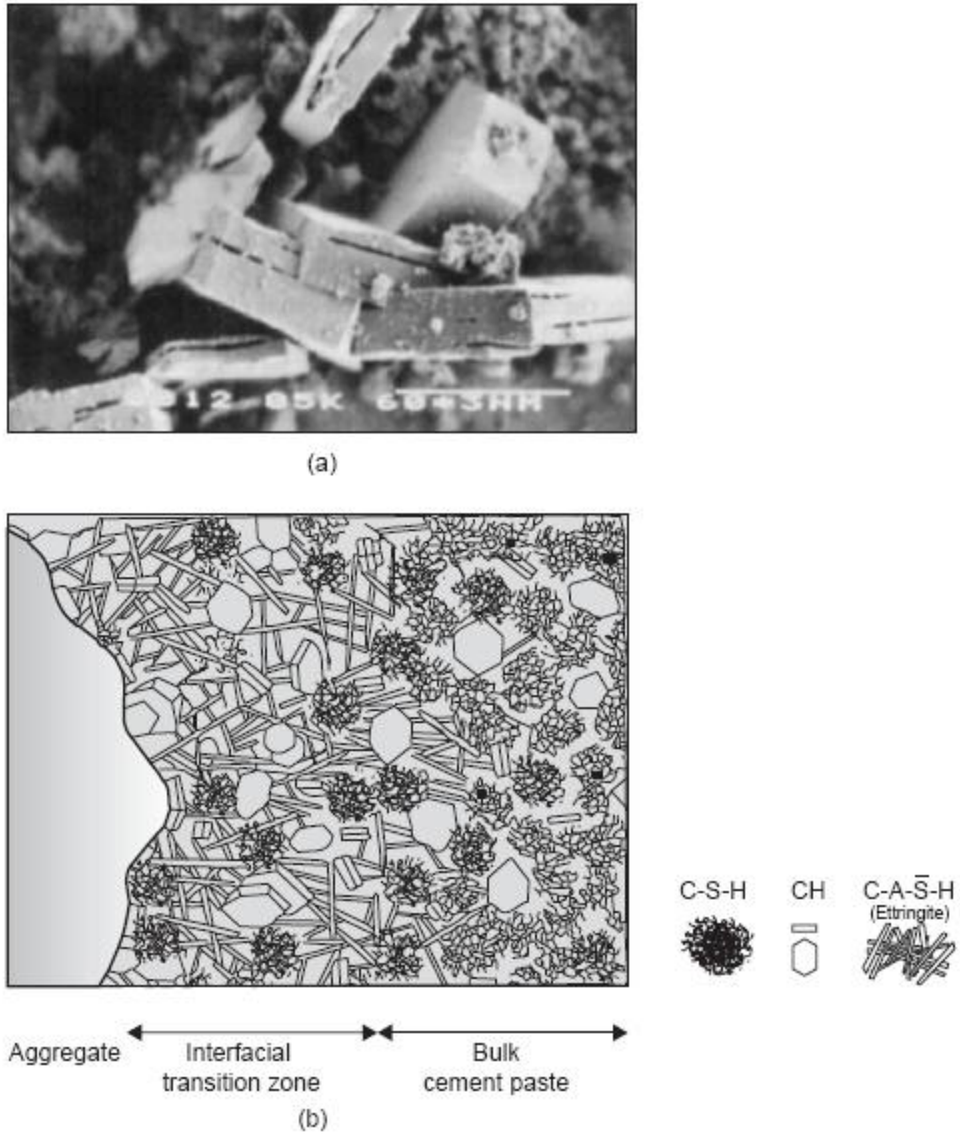


Figure 2-14 (*a*) Scanning electron micrograph of the calcium hydroxide crystals in the interfacial transition zone. (*b*) Diagrammatic representation of the interfacial transition zone and bulk cement paste in concrete.

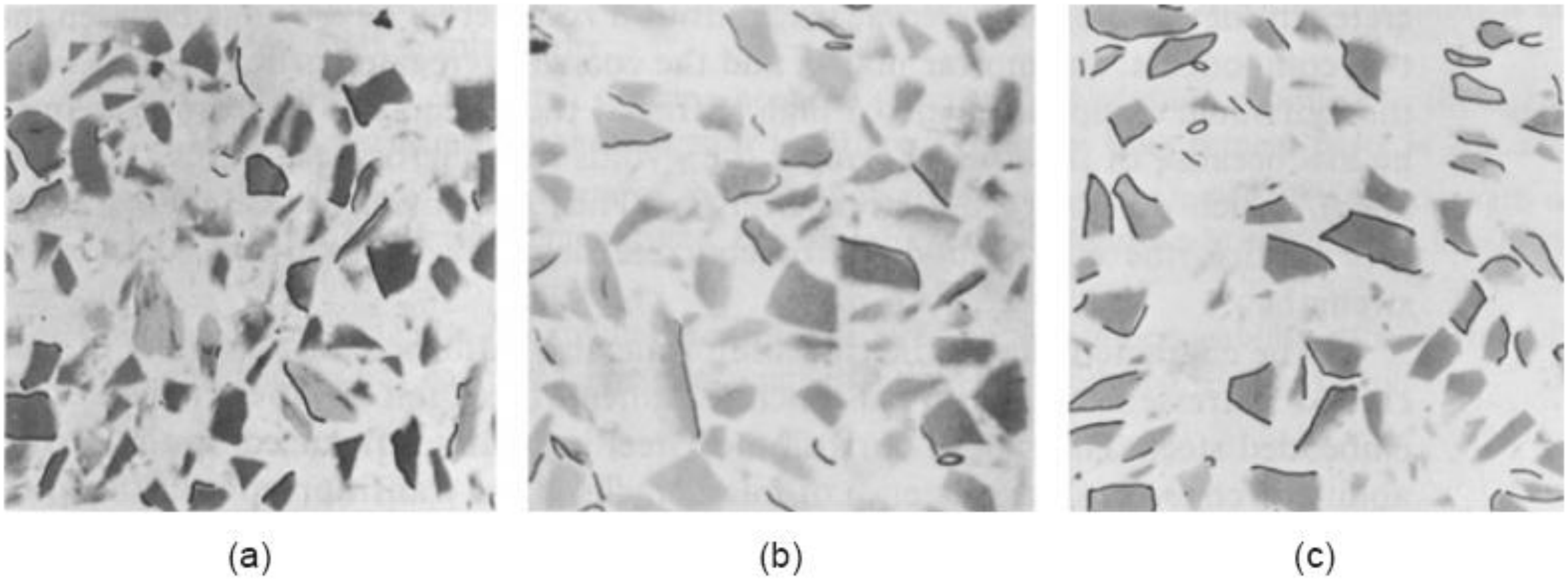


Figure 2-15 Typical cracking maps for normal (medium-strength) concrete: (*a*) after drying shrinkage; (*b*) after short-term loading; (*c*) for sustained loading for 60 days at 65 percent of the 28-day compressive strength. (From Ngab, A.J., F.O. Slate, and A.M. Nilson, *J. ACI, Proc.*, Vol. 78, No. 4, 1981.)