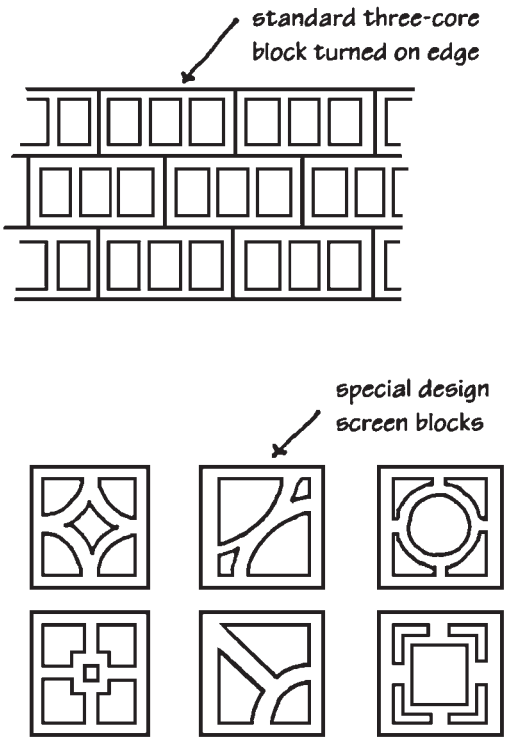

Figure 4-15 Concrete masonry screen block.

4½ to 6 in. deep. Solid units are usually of proprietary design, and sizes and shapes will vary among manufacturers. Thicknesses range from 2½ to 5½ in., depending on the type of service and traffic load anticipated. Heavy-duty performance can be provided for industrial areas and roadways when speeds do not exceed about 40 mph.

ASTM C936, *Standard Specification for Solid Concrete Interlocking Paving Units,* governs abrasion resistance and resistance to freeze-thaw, limits absorption to 5% and sets minimum compressive strength at 8000 psi. ASTM C1319, *Standard Specification for Concrete Grid Paving Units,* limits absorption to 10% and sets minimum net area compressive strength at 5000 psi (*see Fig. 4-19*).

4.6.4 Segmental Retaining Wall Units

One of the most recent developments in the concrete masonry industry is the dry-stacked, interlocking concrete block retaining wall. Referred to as segmental retaining walls (SRWs), a variety of proprietary units and systems are available (*see Fig. 4-20*). The systems are designed to step back slightly in each course toward the embankment. Some units interlock simply by their shape, while others use pins or dowels to connect successive courses. The units use high compressive strengths and low absorption characteristics to resist spalling and freeze-thaw damage. Because they are dry-stacked without mortar, segmental retaining wall systems are simple and fast to install. The open joints in SRWs allow free drainage of soil moisture, and the

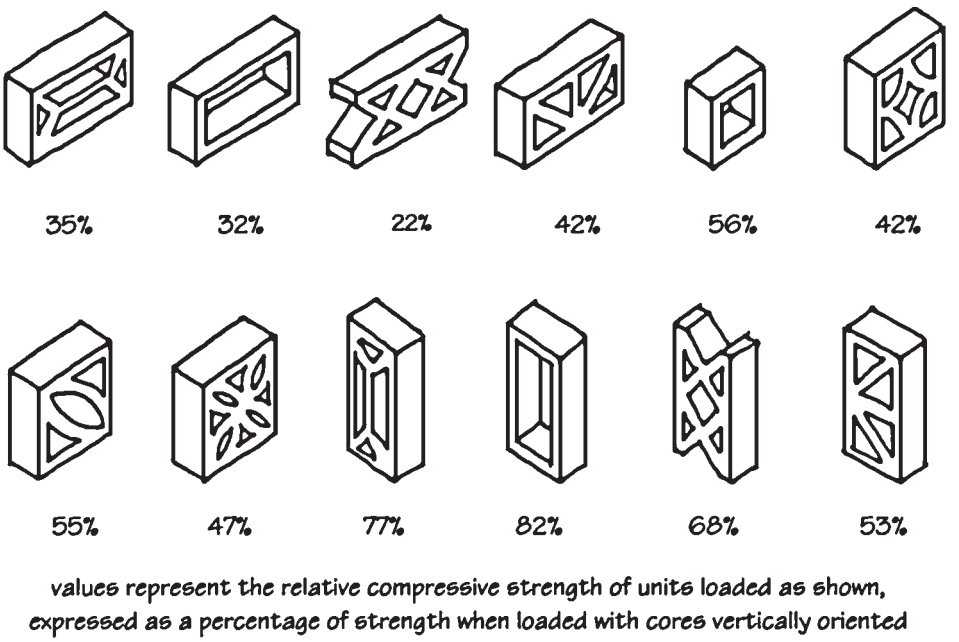

Figure 4-16 Relative compressive strength of concrete masonry screen block when oriented perpendicular to normal bedding.

stepped-back designs reduce overturning stresses. (Refer to Chapter 13 for design and installation requirements.)

4.7 PROPERTIES AND CHARACTERISTICS

CMU physical properties and characteristics fall into a number of structural, aesthetic, and functional categories. The two basic aspects, strength and absorption, have the greatest influence on overall performance. Compressive strength varies with the type and gradation of the aggregate, the water-cement ratio, and the degree of compaction achieved in molding. In general, the lighter-weight aggregates produce slightly lower strength values and have increased rates of absorption (*see Fig. 4-21*).

4.7.1 Unit Strength

Aggregate size and gradation as well as the amount of mixing water affect compaction and consolidation, and are important determinants of strength. Reducing unfilled voids between particles by 1% with extra compaction may increase block strength by as much as 5%. Higher compressive strengths are generally associated with wetter mixes, but manufacturers must individually determine optimum water proportions to obtain a balance among moldability, handling, breakage, and strength. For special applications, higher-strength units may be obtained from the same aggregates by careful design of the concrete mix and slower curing, increasing net strength ratings to as much as 4000 psi.

Other CMU structural values can be estimated from compressive strength. *Tensile strength* generally ranges from 3 to 5% of net compressive