use of solid units or solidly grouted hollow units for one or more courses under the lintel bearing, so that loads are distributed over a larger area.

The National Concrete Masonry Association (NCMA) design table in *Fig. 11-10* is based on typical equivalent uniform loads of 200 to 300 lb/lin ft for wall loads, and 700 to 1000 lb/lin ft for combined floor and roof loads. The table can be used to determine required lintel size and reinforcing for various spans subject to this type of loading.

11.1.4 Reinforced Brick Lintels

Standard brick masonry units are also adaptable to reinforced lintel design even though they do not have continuous channels for horizontal steel. Reinforcing may be located in bed joints or in a widened collar joint created by using half-units (*see Fig. 11-11*). Manufacturers of 8-in. hollow brick also produce lintel units similar to those of concrete masonry.

Figure 11-12B shows a reinforced brick lintel capable of carrying the same loads as the three steel angles in *Fig. 11-12A*. The reinforced brick lin-

Required Reinforcement for Simply Supported CMU Lintels

Type of Loading	Nominal Size of Lintel Section (in.)	Clear Span 3'-4"	4'-0"	4'-8"	5'-4"	6'-0"	6'-8"	7'-4"	8'-0"
Wall loads (200-300 lb/lin.ft)	6 x 8	1 #3	1 #4	1 #4	2 #4	2 #5	–	–	–
	6 x 16	–	–	–	–	1 #4	1 #4	1 #4	1 #4
Floor and roof loads (700-1000 lb/lin.ft)	6 x 16	1 #4	1 #4	2 #3	1 #5	2 #4	2 #4	2 #5	2 #5
Wall loads (200-300 lb/lin.ft)	8 x 8	1 #3	2 #3	2 #3	2 #4	2 #4	2 #5	2 #6	–
	8 x 16	–	–	–	–	–	–	2 #5	2 #5
Floor and roof loads (700-1000 lb/lin.ft)	8 x 8	2 #4	–	–	–	–	–	–	–
	8 x 16	2 #3	2 #3	2 #3	2 #4	2 #4	2 #4	2 #5	2 #5

Figure 11-10 Steel reinforcement for CMU lintels. (*From National Concrete Masonry Association,* TEK Bulletin 25, *NCMA, Herndon, VA.*)

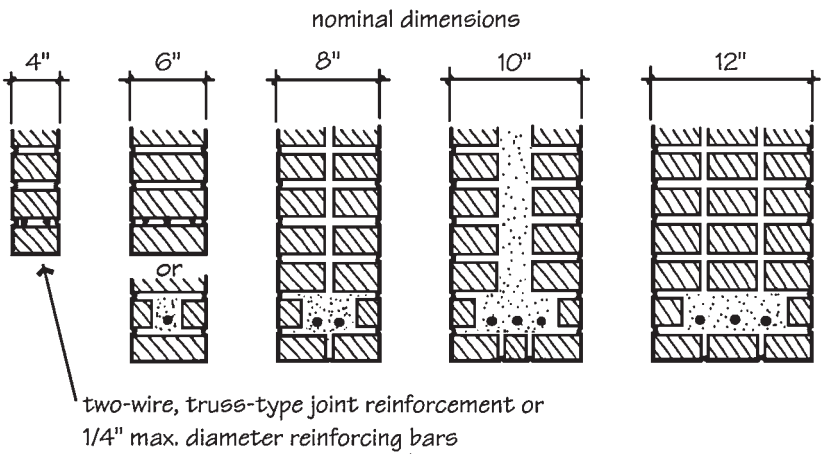

Figure 11-11 Reinforced brick lintels.

tel is more economical because less steel is required, so it is a more efficient use of structural materials. The combined action of the masonry and the steel reinforcing bars is more efficient than support provided by steel alone.

11.1.5 Prefabrication

Reinforced brick and concrete masonry lintels are normally built in place by using temporary shoring to support the wall weight until the section has cured sufficiently to carry superimposed loads. Soffit brick may be standard units or special shapes, and is laid with mortar in the head and collar joints only. Reinforced brick and CMU lintels may also be prefabricated, however. This eliminates the need for shoring and allows work to proceed more rapidly.

11.2 ARCHES

Arches may be constructed in various forms, such as *segmental, elliptical, Tudor, Gothic, semicircular,* and *parabolic* to *flat* or *jack* arches (*see Fig. 11-13*). The primary advantage of an arch is that under uniform loading conditions, the induced stress is principally compression rather than tension (*see Fig. 11-14*). For this reason, an arch will frequently provide the most efficient structural span. Since masonry's resistance to compression is greater than to other stresses, it is an ideal material for the construction of arches.

Arches are divided structurally into two categories. *Minor arches* are those whose spans do not exceed 6 ft with a maximum rise/span ratio of 0.15, with equivalent uniform loads of the order of 1000 lb/ft. These are most often used in building walls over door and window openings. *Major arches* are those whose spans or loadings exceed the maximum for minor arches. With larger spans and uniformly distributed loads, the parabolic arch is often the most structurally efficient form.

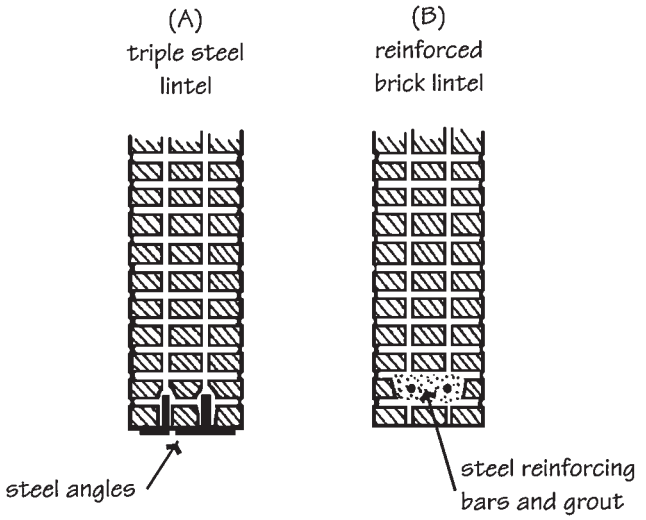

Figure 11-12 Steel angle lintel (A) is less efficient because it requires more steel than a reinforced brick lintel (B) with same load-carrying capacity. (*From BIA* Technical Note 17H.)