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MASONRY PAVING AND FIREPLACES

Two of the most common non-structural masonry applications are paving and fireplaces. Masonry's non-combustibility and heat storage capacity have always made it the material of choice for functional fireplaces, and its aesthetic warmth is symbolic even in purely decorative non-functional hearths.

Roads made of stone paving blocks were built by the Romans over 2000 years ago, some of which are still in use today. Many cities in the United States and Europe also have brick streets that continue in service after many years of heavy use, and have proved both durable and easy to maintain. After World War II, economical methods of manufacturing high-strength concrete paving units were developed. Since their introduction, concrete pavers have been used extensively in Europe and increasingly in the United States and Canada.

14.1 MASONRY PAVING

Clay, concrete, and stone paving units may all be used for interior or exterior applications, and may be installed over different sub-bases suitable for residential and commercial buildings, walkways, patios, streets, and parking areas. Paving assemblies are classified in accordance with the type of base used and the rigidity or flexibility of the paving itself. *Rigid paving* is defined as units laid in a bed of mortar and with mortar joints between the units. *Flexible paving* contains no mortar below or between the units.

Base supports may be rigid, semirigid, flexible, or suspended. A *rigid base diaphragm* is a reinforced concrete slab on grade, and can accommodate either rigid or flexible paving. A *semirigid continuous base* usually consists of asphalt or other bituminous road pavement, and is suitable for flexible paving. A *flexible base* is compacted gravel or a damp, loose, sand-cement mixture that is tamped in place. Only flexible paving should be laid over this type of base. *Suspended diaphragm* bases are structural floor or roof deck assemblies, the composition of which will vary depending on the type of structural system used. Either flexible or rigid paving may be used on suspended decks.

Selection of the type of paving system to be used will depend to a large extent on the desired aesthetic effect and the intended use. There are a number of design considerations that must be taken into account, particularly for outdoor paving. Heavy vehicular traffic generally requires rigid concrete diaphragms or semirigid asphalt bases. Lighter vehicular and pedestrian traffic may be supported on flexible bases and flexible paving. Traffic patterns, which dictate the size and shape of a paved area, may also influence the choice of base and cushion material. Successful installations always depend on proper subgrade preparation and removal of all vegetation and organic materials from the area to be paved. Soft spots of poor soil should be removed and filled with suitable material, then properly compacted.

Site preparation and system selection should also take into consideration the location of underground utilities and storm drainage systems. With rigid concrete bases and rigid masonry paving, access must be provided by means of manholes, cleanout plugs, and so on. If semirigid or flexible bases are used with flexible paving, however, the user may gain unlimited access to underground pipes and cables without incurring the expense of extensive surface repairs. This fact is generally cited as one of the major advantages of flexible masonry paving, which allows utility repairs and alterations by simply removing, stockpiling, and then replacing the paving units and base material. No air hammers or concrete pours are required to complete the work, and there is reduced danger of damage to utilities by the elimination of such equipment.

14.1.1 Outdoor Paving

Drainage is very important in the consideration of all outdoor paving systems, and excessive runoff is a legitimate environmental concern. In addition to mortarless paving systems, which permit a degree of water percolation through the joints, masonry paving units have been developed that lessen the impact of storm drainage even further. These concrete masonry grid pavers contain open spaces designed for growth of indigenous grasses to maintain soil permeability while providing a stable base for vehicular traffic. Grid units have also been used in a variety of applications for soil stabilization, erosion control, and aesthetic treatment of drainage and access. Installations include shoulder slopes along highways and under bridges, the lining of canals, construction of mobile home parks, boat launch ramps, fire lanes adjacent to apartments and hotels, and erosion control of steep embankments (see *Fig. 14-1*).

14.1.2 Bases

The successful performance of masonry paving systems depends to a great extent on proper base preparation for the type of pedestrian or vehicular traffic anticipated. Flexible paving is installed without mortar over sand, gravel, or asphalt bases (see *Fig. 14-2*). Rigid paving is installed with a mortar setting bed over a concrete base, and has mortar in the head joints between units (see *Fig. 14-3*).

Gravel bases provide maximum drainage efficiency and prevent the upward flow of moisture by capillary action. Clean, washed gravel should be specified. Bases of unwashed gravel mixed with fine clay and stone dust are popular low-cost systems, but they will cause a loss of porosity and effective drainage due to hardening with the absorption of moisture. Masonry units in