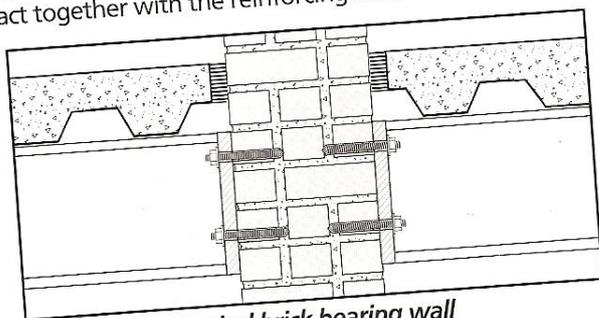


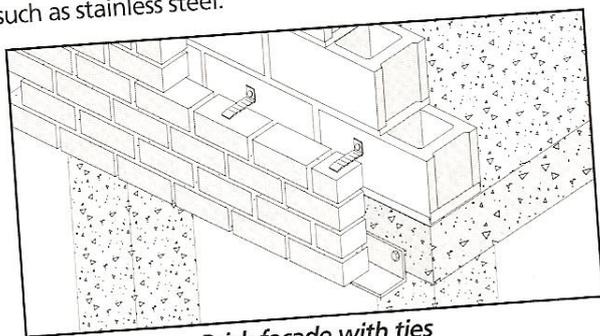
Brick is produced as a solid masonry unit or with cores during extrusion. The cores reduce the weight of the brick and help it to lay better. ASTM Specification C 652 describes hollow brick masonry units. Hollow brick is defined as having a cross sectional bearing area which is less than 75% of the gross area of the brick measured in the same plane. Hollow brick units have stricter physical property requirements than those for structural clay tile. The cores often create a problem when attempting to install anchors because the resulting thin walls cannot sustain the high bearing stresses applied by a mechanical anchor. In this case, an adhesive anchor is recommended. Brick walls are generally not suitable for powder actuated fasteners.

Brick can be used to form a load bearing wall and as a veneer or facade. ASTM Specification C 62 describes solid building brick while Specification C 216 describes solid facing brick. To provide greater resistance to lateral loads, walls are often strengthened with steel reinforcing bars. This is required by the Uniform Building Code in Seismic Zones 2, 3, and 4. The wythes of brick are tied together and then grout filled to allow them to act together with the reinforcing bars.



Typical brick bearing wall

When brick is used as a building facade, it is important to properly tie it to the backup wall and structure using anchors manufactured from a non-corrosive material such as stainless steel.



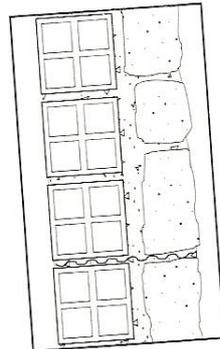
Brick facade with ties

In this manual, guide load capacities are published for anchors installed in solid brick and in multiple wythe brick walls. Anchors were tested in walls constructed using brick meeting the requirements of ASTM C 62, Grade SW. Grade SW signifies that it is suitable for use in exterior walls exposed to severe weathering. The minimum compressive strength from the ASTM specification is 1,250 to 3,000 psi, however, actual strengths

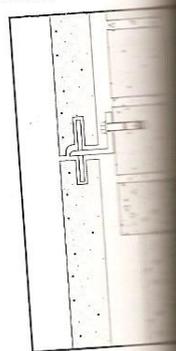
typically range as high as 6,000 to 8,000 psi. Both single and multiple wythe brick walls were constructed using a Type S cement-lime mortar meeting ASTM C 270.

2.2.2.3 Stone

Natural stone is available in a variety of types, colors, and textures for use in many building applications. Dimensionally occurring rock which has been fabricated to a specific size and shape is referred to as dimension stone, as opposed to broken or crushed stone such as aggregate used for concrete. The three main classes of rock used to fabricate dimension stone are igneous, metamorphic, and sedimentary. Granite is an igneous material while marble building stone is metamorphic. Both of these stones tend to be hard. Limestone or sandstone which are sedimentary materials. The strength and the quality of stone can vary dramatically from each stone quarry and for different geological locations. Generally, anchors installed in material such as limestone or sandstone will have load capacities similar to those obtained in 2000 psi concrete. In harder stone such as granite or marble, the load capacities will be similar to 4000 or 6000 psi concrete. Granite is recommended because of the wide variety of strengths of natural stone. Stone is not considered a suitable base material for powder actuated fasteners.



Stone with tile back-up



Stone with backup wall

Dimension stone units can be used to form a load bearing wall and as a veneer or facade. Masonry made using stone with little or no shaping is called rubble while that using precisely cut stone is called ashlar. When used as a building facade, it is important that the stone be properly tied to the backup wall using anchors manufactured from a non-corrosive material such as stainless steel. ASTM Specification C 216 describes dimensional stone for use in building construction. Specifications for individual stones include C 503 for marble, C 568 for limestone, C 602 for granite, and C 616 for quartz-based materials.

2.2.2.4 Structural Clay Tile

Structural clay tile units are found in a variety of sizes, and strengths for use primarily in walls. They are manufactured from clay, shale, or other materials, extruded to shape then hardened through a firing process. Finished units may have a natural or glazed surface. During the extrusion process,