15
INSTALLATION AND WORKMANSHIP

Masons and bricklayers belong to one of the oldest crafts in history. The rich architectural heritage of many civilizations attests to the skill and workmanship of the trade, and the advent of modern technological methods and sophisticated engineering practices has not diminished the importance of this aspect of masonry construction. The best intentions of the architect or engineer will not produce a masterpiece unless the workmanship is of the highest order and the field practices are as exacting and competent as the detailing.

15.1 MOISTURE RESISTANCE

Workmanship has a greater effect on the moisture resistance of masonry than any other single factor. Key elements in the quality of workmanship include:

- Proper storage and protection of materials
- Consistent proportioning and mixing of mortar ingredients
- Full mortar joints
- Complete mortar-to-unit bond
- Continuity of flashing
- Unobstructed weep holes
- Tooled joint surfaces
- Protection of uncompleted walls

Among these elements, mortar placement ranks high in limiting the amount of moisture that penetrates through the wall face. Such leakage can usually be traced to either capillary passages at the mortar-to-unit interface, partially filled mortar head joints, or cracks caused by unaccommodated building movements. Virtually all masonry walls suffer some moisture penetration because of joint defects and other design, construction, or workmanship

errors. It is for this reason that the installation of flashing and weep holes is critical in collecting and draining any water that does enter the wall. This backup drainage system provides redundancy in moisture control and allows the construction to be somewhat forgiving of defects. Since it *is* the backup system, though, the flashing installation itself cannot tolerate defects or discontinuities without providing avenues for moisture penetration directly to the interior of the building.

15.2 PREPARATION OF MATERIALS

Field quality control begins with the proper storage and protection of materials. Preparations necessary prior to construction will vary according to the specific materials and conditions involved.

15.2.1 Material Storage and Protection

Proper storage and protection of masonry materials at the project site are critical to the performance and appearance of the finished construction. Materials properly stored and covered will remain in good condition, unaffected by weather. Improper procedures, however, can result in damage to units and contamination or degradation of mortar and grout ingredients.

Brick and block units should be stored off the ground to prevent staining from contact with the soil and absorption of moisture, soluble salts, or other contaminants that might cause efflorescence in the finished work. Stored units should be covered for protection against the weather. Cut stone usually requires stacking on wooden pallets or frames with spacers between panels to allow air circulation. Treated wood may contain chemicals that stain light-colored stone. Handling of all masonry should avoid chipping or breakage of units.

Mortar and grout aggregates should also be covered to protect against contamination from rain, snow, ice, and blowing dust and debris. Different aggregates should be stockpiled separately. Packaged mortar and grout ingredients should be received in their original containers with labels intact and legible for easy identification. Broken packages, open containers, and materials with missing or illegible identification should be rejected. All packaged materials should be stored off the ground and covered to prevent moisture penetration, deterioration, and contamination.

15.2.2 Mortar and Grout

The mortar mix required in the project specifications must be carefully controlled at the job site to maintain consistency in performance and appearance. Consistent measurement of mortar and grout ingredients should ensure uniformity of proportions, yields, strengths, workability, and mortar color from batch to batch. Volumetric rather than weight proportioning is most often called for, and most often miscalculated because of variations in the moisture content of the sand. Common field practice is to use a shovel as the standard measuring tool for dry ingredients. However, moisture in the sand causes a “bulking” effect, and the same weight of wet sand occupies more volume than dry sand. Such variables often cause over- or undersanding of the mix, which affects both the strength and bonding characteristics of the mortar. Oversanded mortar is harsh and unworkable, provides a weak bond with the masonry units, and performs poorly during freeze-thaw cycles.

Simple field quality control measures can be instituted through the use of 1 cu ft measuring boxes (*see Fig. 15-1A*). The mixer may then determine