not interfere with the workers or attempt to direct their activities. If methods or procedures are observed that appear to conflict with the specifications or which might jeopardize the quality or performance of the work, they should be called to the attention of the contractor or foreman, and adjustments made as necessary.

18.4.3 Workmanship

Perhaps the single most important element in obtaining strong, water-resistant masonry walls is full mortar joints and proper joint tooling. Partially filled head joints or furrowed mortar beds will produce voids that offer only minimal resistance to moisture infiltration. Poorly tooled joints allow excessive water infiltration (refer to Chapter 9). The first course of masonry must be carefully aligned vertically and horizontally, and fully bedded to assure that the remainder of the wall above will be plumb and level. Even if hollow CMU construction requires only face-shell bedding, this critical base course must have full mortar under face shells and webs. Head joints must be fully buttered with mortar and shoved tight against the adjacent unit to minimize water infiltration. Units must not be moved, tapped, or realigned after initial placement, or the mortar bond will be destroyed. If a unit is displaced, all head and bed mortar must be removed and replaced with fresh material. Spot checks for proper bond can be made by lifting a fresh unit out of place to see if both faces are fully covered with adhered mortar.

The inspector should check for proper embedment and coverage of anchors, ties, and joint reinforcement, and should monitor vertical coursing and joint uniformity. Differential widths or thicknesses of mortar joints can misalign the modular coursing and interfere with proper location of openings, lintels, and embedded items. Storypoles, string lines, and tapes or templates should be used to check coursing between corner leads. Nail and line pinholes must be filled with mortar when string lines are removed to avoid water penetration through these voids. Work of other trades that penetrates the masonry should be incorporated during construction of the wall and not cut in later. Drainage cavities must be kept free of mortar fins and droppings to avoid plugging weep holes, damaging flashing, or interfering with grout pours. When they become thumbprint hard, joints should be tooled to compress the mortar surface.

The mason should place all vertical and horizontal reinforcement as the work progresses, holding the bars in correct alignment with spacers or wire. Minimum clearances should be maintained, and bar splices lapped and securely tied. The inspector should check to see that reinforcement is free of rust, loose scale, or other materials that could impair bond to the mortar. Care should be taken to avoid moving or jarring vertical steel that is already embedded in lower grouted courses.

Inspection should also include proper installation of flashing, control joints, expansion joints, lintels, sills, caps, copings, and frames. Door frames must be adequately braced until the mortar has set and the masonry work surrounding them is self-supporting.

Grouting is important to the structural integrity of reinforced masonry walls. Cavities and cores should be inspected before the grout is placed, and any remaining dirt, debris, mortar droppings, or protrusions removed before the work proceeds. Cleanout plugs left for high-lift pours allow visual inspection from below by use of a mirror inserted through the opening. Cleanout units should be fully mortared and shoved into place after inspection, then

braced against blowout from the fluid pressure of the grout against the uncured mortar. The consistency of the grout should allow for easy pouring or pumping, and complete filling of the space. Vibrating or consolidation to remove air bubbles and pockets also ensures that the grout covers fully around and between ties and reinforcement. Grout consolidation should occur 5 to 10 minutes after placement, and reconsolidation after initial water loss and settlement. Reconsolidation should occur within 30 minutes of initial consolidation. A low-velocity electric vibrator placed into each grouted core or at 12- to 16-in. intervals in a grouted cavity for a few seconds is considered sufficient. Timing of grout pours should be monitored to avoid excessive lateral pressure on uncured joints.

18.4.4 Protection and Cleaning

Throughout the construction period, both the masonry materials and the work must be protected from the weather. Materials must be stored off the ground to prevent contamination or staining. Exposed tops of unfinished walls must be covered each night to keep moisture out of the cores and cavities by draping waterproof plastic or canvas 2 ft down each side. Cold weather may require heating of materials and possibly the application of heat during the curing period. Hot, dry climates cause rapid evaporation, and mortar mixes may have to be adjusted to compensate for premature drying. Both hot and cold weather may necessitate moist curing. The inspector must assure that the required precautions are taken to avoid harmful effects, and must also see that completed work is protected from damage during other construction operations.

Suitable cleaning methods must be selected on the basis of the type of stain involved and the type of material to be cleaned. Improper use of cleaning agents can create more problems than are solved by their application. Mortar smears on the face of the masonry should be removed daily before they are fully hardened, and dry-brushed when powdery to prevent stains. Paints, textured coatings, or clear water repellents, if specified, should be applied carefully over clean, dry walls, and adjacent work protected against splatters and drips.

It is the inspector's job to see that the instructions and requirements of the drawings and specifications are carried out in the field. Safeguarding the quality of the work without impeding its progress is best achieved through cooperation with the contractor and workers. Good design and good intentions are not sufficient in themselves to assure quality of the finished product. The inspector can facilitate the proper execution of the work, ensuring masonry structures that are as durable and lasting as the materials of which they are made.

18.4.5 Moisture Drainage

Early in the construction, the drainage system should be checked to assure the unobstructed flow of water to the weeps and rapid drainage of moisture from the wall. A quick field check involves briefly placing a water hose in the cavity after the mortar has had a chance to set (*see Fig. 18-3*). Water should drain immediately and freely from the weep just below the test location (*see Fig. 18-4*). As water travels laterally along the flashing, it should begin to drain from adjacent weeps as well. The test should be brief to avoid saturating the cavity, but is a quick and effective means of detecting blocked weeps.