ARCHITECTURE

EHLINGER & ASSOCIATES THIRD QUARTER 2000

ARCH of TITUS
Rome, Italy

The Arch of Titus serves as the gateway entrance on the Via Sacra, the road that leads to all the Roman Forums from the East, where the Colosseum is. The Romans customarily built arches like this one as ornamental and commemorative (of triumph in battle) portals to forums; at main street intersections; and as a portal entry through the defensive walls protecting the town. This arch was built in 82 AD to commemorate the capture of Jerusalem and destruction of the Temple by the General Titus, a son of Emperor Vespasian Augustus, in 70 AD, and is thus a triumphal arch. Titus became Emperor himself in 79 AD until 81 AD. The arch was actually built by Titus' brother, Domitian, when he became Emperor in 82 AD.

Monumental arches first occurred as a building type of Roman architecture about 200 BC, but few remain today from that period. Most are from the reign of Augustus (27 BC - 14 AD) onward. Usually these arches are adorned with tablets inscribed with praise or titles of dedication of the commemorative event, and bas relief and three dimensional sculptures that tell the story of the triumphant battle. Titus's arch originally had sculptures on top of it of various gods at the four corners (a bronze quadriga) and of Titus himself in the center in his chariot with four horses teamed to pull it. The bas reliefs depict Titus in his chariot again on one facade and the spoils of the Temple of Jerusalem on the other. The keystones are carved with figures of the gods Roma and Fortuna.

This arch has engaged columns at the corners and flanking the center arched opening which are the earliest known example of the Roman Composite Order column capital. In this order, the Romans combined the Corinthian decorative capital with an Ionic scrolled type capital, where the scroll is bent into a three dimensional compound curve shape on the diagonal axes of the capital. The Corinthian decoration is placed below and in between the scrolls. There is only one arched opening with a soffit (exterior ceiling) with deep coffers (recesses) in Titus' arch, while other triumphal arches have three arched openings.

CONGRATULATIONS!

Congratulations to R. Perrin Ehlinger for passing the Architectural Registration Exam (ARE) recently. This marks the culmination of a long and arduous journey for Perrin: three years of internship and an additional year of being an exam candidate; and nine separate tests that comprise the ARE.

Unlike years ago when an architectural graduate took the licensing exam immediately upon graduation, architectural graduates are now required to complete an internship that takes a minimum of three years to complete before being qualified to take the ARE for licensure. This internship protocol has specific tasks that have to be completed, which may or may not be available for the intern to perform in the office where the intern is working. The tasks have to be certified by the employer acting as a mentor and periodically reported to the National Council of Architectural Registration Boards (NCARB). A fee of about $150 per year is paid for this recordation, after an initial registration fee of $230 is paid to NCARB. After the tasks are completed the intern then is an exam candidate.

The ARE is a series of nine exams, all given on computer, and costing slightly over $1,000. If any exam module is failed, it may be retaken six months later. Results are given anywhere from 2 to 6 weeks after taking.

ITS THE LAW!
(BUT ITS WRONG!)

Commercial interests have made significant changes over the years to building codes (The Law) in the pursuit of competitiveness, by lowering standards and quality to make the end product cheaper. Different groups comprise the total body that confects the building code, and sometimes their different interests produce a result that is detrimental to the end user of the building. One of the most common defects that we encounter in the forensic portion of our architectural practice are defective brick veneer and brick cavity walls -- walls that leak.

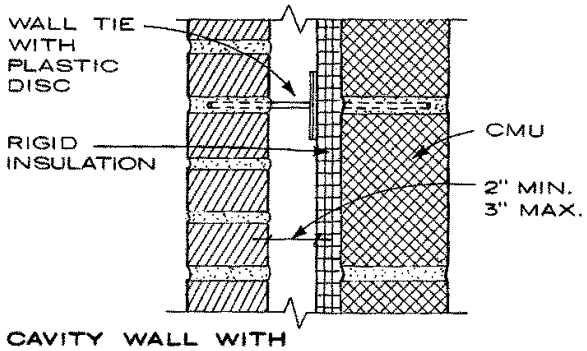
It has been known in the construction industry for a long time that the air space or cavity in a brick veneer wall should be a minimum of two inches wide to be effective and thereby prevent leaks.

A brick veneer wall functions with the cavity acting as a pressure equalization chamber. The cavity stops leaks that occur when the exterior pressure exceed the interior pressure -- when the water is seemingly "sucked into" the building. The brick is acknowledged to be porous, to convey water through the pores of the masonry and the mortar, and also to have cracks that will convey water also from

2200 Houma Blvd., Metairie, LA 70001-1399 (504) 455-8911 • 3109 Ivy Ave. SW, Huntsville, AL 35805-4698 (256) 534-1900

the exterior face to the interior face. The back-up wall is designed to be pressure or air tight, so that the water that makes its way into the cavity can then drip to the bottom of the cavity on the interior face of the brick and then drain out through weepholes on a "watershelf" or "brickshelf" that is below the level of the slab of the finish floor.

Leaks occur in a brick veneer or cavity wall when there are mortar bridges that span across the cavity and thus "bridge" or convey the water that finds its way through the brick from the outer face to the inner face across the cavity gap and to the inner or back-up wall. Leaks also occur when there is impacted mortar at the bottom of the cavity which



CAVITY WALL WITH RIGID INSULATION

does the same thing as the bridges and also blocks the weepholes.

The reason the cavity / air space has to be two inches wide at a minimum is that this dimension will comfortably allow a mason to lay up the wall and keep the cavity clean. The mason does this by suspending a 2x4 in the cavity and pulling it up as he lays the brick veneer portion of the wall. He periodically pulls it out of the cavity and cleans it off, repositions the board and then resumes laying the wall.

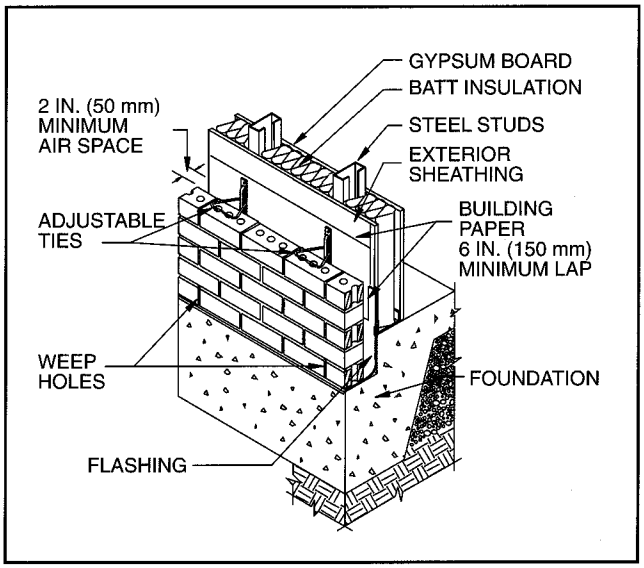
Homebuilders as a group do not like to make the cavity / air space a minimum of two inches wide because the watershelf in the slab is typically formed with a 2x6 board on the flat (an actual 5-1/2" wide) nailed into the side of the exterior form board of the slab. The brick is usually 3-5/8" wide and the sheathing is usually 1/2" thick, making a total of 4-1/8" to be subtracted from the 5-1/2" available, leaving a cavity of a net 1-3/8". It costs more to form the watershelf to give one an actual two inch wide cavity: 3-5/8" + 1/2" + 2" = 6-1/8". There is no standard 6-1/8" wide board -- but one can get four to six multiple uses of a specially ripped board.

The Standard Building Code (SBC, which applies to commercial and institutional buildings) and the CABO (Council of American Building Officials) One and Two Family Dwelling Code in the mid-1980's required that the cavity be a minimum of 2" wide when the wall was entirely of masonry, and the SBC was silent to brick veneer, while the CABO called for a 1" wide air space or solidly mortared space!

The Brick Institute of America (BIA) always recommended that masonry cavity walls have a cavity of minimum 2" width, and in 1987 changed their recommendations from 1" to 2" for brick veneer walls as well.

Today's SBC incorporates by reference the ***Building Code Requirements for Masonry Structures ACI 530-95***, while the CABO is silent as to the requirements for totally masonry walls and is still the same for brick veneer walls. The ***ACI 530-95*** requires a 1" minimum width cavity, while the commentary of this very same code says that a 1" width cavity doesn't work, because you can't keep that narrow a cavity / air space clean, and that you really should use a 2" minimum width!

Another change from earlier codes that borders on being downright dangerous is the change in the CABO Code (SBC did not change this) to allow masonry to be supported on structural wood members. Before, this was prohibited for several reasons: wood tends to "creep", that is sag over time due to actual molecular displacement within the material, such that the sagging continues to increase through time; the masonry is porous and allows water to come in contact with the wood which fosters fungus rot and termites, thereby exacerbating the creep and sag problem, sometimes to the point of collapse.



Finally, the CABO Code does not acknowledge in all exterior wall systems the necessity to apply a vapor barrier immediately behind the exterior water barrier or face of the wall. It requires asphalt impregnated felt in brick veneer walls to be applied over the sheathing, but not in vinyl, aluminum or wood siding. The Code is saying that you need the felt or housewrap to repel free water that you may encounter in brick veneer, but gives no cognizance to the water vapor / condensation phenomenon. The sheathing will in the summer tend to be significantly cooler than the exterior ambient humid air due to the air conditioning inside. In the winter, the reverse will occur. Those areas of the wall with high thermal transfer due to electrical boxes, plumbing, or even a holiday in the typical batt insulation between the studs will be even colder. The warm moist air will condense to free water periodically behind the siding on the cold sheathing, and cause the wood based sheathing to rot.