

Are Control Joints Needed with Adhered Concrete Masonry Veneer?

By: Herb Nordmeyer - October, 2011

If you want fabulous texture on your building, consider Adhered Concrete Masonry Veneer (ACMV). You may be familiar with this product under a different name. Common names include, but are not limited to, manufactured stone, manufactured stone veneer (MSV), synthetic stone, and simulated stone. It is also known by several of the popular brand names under which it is sold. Since it has only been around for the past 40 years, when compared with stucco, brick, and natural stone, it is considered the new kid on the block.

Since ACMV is still new, it is not yet covered under the CODE and consensus standards as other building materials are, but is covered by evaluation reports. Rudimentary installation instructions have been included in the evaluation reports. When applicators applied the ACMV, they took the rudimentary installation instructions and improvised.

Developing of Industry Standards

Brick, natural stone, and stucco have been used for a much longer period of time and the construction community is much more comfortable with their use. To ensure that the ACMV industry is complying with standards which produce equally-robust façades as are produced by brick, natural stone, and stucco, the Masonry Veneer Manufacturer's Association (MVMA) was formed. The MVMA initiated the development of installation standards and contacted ASTM concerning the development of consensus product and installation standards. The MVMA installation standards can be downloaded from their website at <http://www.masonryveneer.org/news.html>.

The process of developing consensus standards through ASTM takes longer. *ASTM Committee C 15 on Manufactured Masonry Units* formed *ASTM Subcommittee C 15.11 on Adhered Concrete Masonry Veneer*, and several task groups. Soon discussions started taking place among ASTM members as to whether ACMV was a stucco, since it used a stucco-like scratch coat, or whether it was a separate type of façade with separate requirements. This was the same discussion that had been going on among building officials, applicators, and suppliers since the first ACMV was used. Previously the determinations were made for individual jobs, but in developing a consensus standard, a determination needed to be made which would impact all future installations of ACMV.

Soon there were discussions taking place in ASTM task groups, at job sites, and at architects' offices around the country. Some people believed that ACMV was a fabulous texture on stucco, so ASTM C 1063 (Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster) should apply. This was countered by statements that ACMV was not stucco, but unit masonry, so stucco standards should not apply. Architects and design professionals were adamant that breaking up the ACMV into panels that were not larger than 144 square feet gave the entire job an unnatural look. More than one owner has stated that if he is going to pay for

a natural-looking stone façade on his building, he is not going to accept a lot of straight lines breaking the surface into small rectangles.

There were discussions concerning drying shrinkage, coefficients of expansion, and thermal movement of stuccos and how they applied to ACMV. These were discussions that engineers enjoyed, but bored most others to tears. Everyone had a strong opinion. No one was showing any interest in compromising to reach an agreement. To help break the impasse, the MVMA asked the author, who has been accused of coining the phrase, “ACMV is nothing more than fabulous texture on stucco,” to sort through the issues and determine which are relevant.

Is There a Problem?

The author’s research quickly determined that most of those who did not feel that ***ASTM C 1063*** should apply had few problems with ***ASTM C 1063*** other than the spacing of control joints. The author then concentrated on similarities and differences between stucco, ACMV, natural stone veneer, and brick veneer, and whether the control joint spacing listed in ***ASTM C 1063*** was appropriate for the application of ACMV.

A façade, whether it is stucco, brick, ACMV, natural stone, or plastic siding, has two major purposes: Aesthetics and to buffer environmental effects. Some of the façades can be used as structural elements, but we will concentrate on the non-structural applications of the different cementitious materials. Some people confuse expansion joints and control joints. Expansion joints are used to isolate various parts of a structure so movement may occur without cracking structural elements of the building. Control joints are used to isolate various parts of a façade so movement may occur without cracking of the façade. This discussion does not apply to limiting the use of expansion joints.

Stucco, brick, natural stone veneer, and ACMV have many common elements. For example, the paste (mortar or stucco) used for each is very similar and has almost identical shrinkage characteristics. Concrete brick, concrete masonry units, and ACMV have almost identical shrinkage characteristics. Stucco, brick, natural stone, and ACMV walls that are built according to CODE provide for any water that passes through cracks to drain down the wall and exit at the bottom of the façade. In humid and other problem areas, rainscreen products can be installed behind each of the façades to enhance the drainage of any water that may get behind the façade.

All cement-based façades crack. Since stucco is monolithic, if it is installed without properly-designed control joints, the cracks tend to show up easily. With unit masonry façades, most of the cracks are at the interface between the mortar and the unit, so they are much more difficult to spot. Get a hand lens and examine a brick wall that does not have any “cracks,” and you will usually find a plethora of hairline cracks. Even though unit masonry façades crack, they are not required to comply with the panel sizes that delineate stucco façades. ACMV walls crack. That cracking is usually in the mortar or at the unit/mortar interface like it is with unit masonry, and is seldom noticed except on close examination.

Stucco façades, unlike façades of brick and natural stone veneer, usually do not have a well-defined cavity between the back of the stucco and the WRB. Since the stucco does not adhere to the WRB, there is a drainage plane between the stucco and the WRB. Water that passes through the stucco, or more properly around the stucco or through cracks in

the stucco, will usually drain between the back of the stucco and the face of the WRB. ACMV façades function in a similar manner.

While water can get behind the WRB of stucco façades where there are tears and holes in the WRB, most of the water penetrating behind the WRB is around penetrations, such as windows, that are not properly flashed. Having observed numerous jobs where there was a single layer of WRB, the author has observed that installing control joints normally increases the number of tears and holes in the WRB of a stucco job. The same thing holds true with installations of ACMV façades.

As mentioned earlier in this article, ACMV has been around for about 40 years. During that time, *ASTM C 1063* has gone through a number of revisions. The *Scope* of *ASTM C 1063* does not mention ACMV and gives no indication that *ASTM Committee C11* which deals with stuccos and plasters ever considered that ACMV was a stucco and needed to comply with the panel size limits listed in *ASTM C 1063*.

The author has observed a number of ACMV panels which are substantially larger than the sizes specified in *ASTM C 1063* without cracking of the units. There is usually hairline cracking between the units and the mortar, but no more than is commonly seen between unit masonry and the mortar.

Discussion

Based on aesthetics alone, there does not seem to be a case for the installation of control joints in ACMV construction.

Based on the likelihood of water penetrating through the WRB, there does not seem to be a case for placing control joints in the lath behind an ACMV façade.

Unlike stucco, which is monolithic and as a result high-lights any cracks, ACMV installations contain “built-in” control joints (grout joints or dry stack stone joints) which provide for expansion or contraction movement. Any cracking that may be experienced is accommodated across several grout joints, thereby allowing a distribution of the separation. Furthermore, each separation is virtually invisible, since these spaces occur at the stone-mortar interface.

Where there are expansion joints in a building, it is appropriate to install an expansion joint in the ACMV façade.

Conclusion

It appears that there is no sound justification for applying the panel sizes listed in *ASTM C 1063* to jobs with a façade of ACMV that is installed according to the installation standard that has been developed by MVMA.

While the evidence appears to be overwhelming, the MVMA is continues to study this issue and document wall areas that are larger than 144 square feet. This documentation includes, but not be limited to, whether cracks are occurring or not, and whether MVMA installation practices were used. With this additional study, a determination can be made as to whether there are any practical limits for constructing oversized panels.

Herb Nordmeyer retired in 2010 and is currently finishing *The Stucco Book – The Basics*, which is scheduled for publication in early 2012. *Forensics and Repairs* and *Creative Stuccoing* are in the works. To learn more about Herb, Google “Stucco Consultant” and open the first hit.