



PLYWOOD UNDER PLASTER

Technique provides for beauty, protection, but some precautions are necessary

By Tom Geary

The use of plywood on the exterior of wood frame construction adds shear strength to walls, that is, it adds lateral support to the entire structure. Cement plaster frequently is installed over a plywood base to provide beauty and protection to the building. The purpose of this article is to offer some precautionary advice concerning plywood sheathing under portland cement plaster.

A sheet of plywood, whether of exterior or interior grade is cellulosic in nature. Wood expands as it absorbs water and shrinks as it dries. Plywood, just like framing lumber, swells and shrinks. Waterproof glue between the plies of wood does not prevent buckling of the sheets. This comment is not a criticism of plywood, an excellent product, rather it is a recognition of a fact of nature.

Expands Outward

When plywood expands on the wall, the expansion generally occurs in an outward direction toward the exterior wall surface. The expansion causes buckles to form in the plywood, generally but not always between studs. It also is possible for plywood to buckle over the studs between staples or nails driven through the plywood into the framing members, especially if the proper nailing schedule was not accomplished.

Builders should require nailing to be done in accordance with specifications. The buckles create strong flexural forces against the inner face of the plaster membrane, after the plaster has hardened and can no longer bend through much of an arc. The effect of relief from the great pressure of expanding wood is that the plaster may break over the buckle.

If the expansive force is great enough, it will exceed the flexural strength of the mortar and crack the plaster membrane. Cracks caused by buckling plywood normally are not straight line cracks; instead they tend to be random in nature; that is, without any pattern. Generally the cracks will consist of three or four tendrils that emanate from a common point or location.

A straight edge placed over the meeting point of the cracks generally will rock slightly, indicating that some force within the wall has pushed the plaster outward from the original plane of the wall surface. Plaster does not move outward after it has stabilized, except when forced by some significant stress.

Water Problems

Unfortunately, when water is applied to cement plaster to cure and improve it, more water is made available to potentially reach and affect the

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plywood sheathing. Certain precautions will be described here.

First, one should ascertain that the sheathing has been applied properly and that the carpenters have adhered to the architect's nailing schedule for plywood.

It is most important that moisture be prevented from contacting the plywood. Several procedures are described here to prevent the ill-effect of buckling wood. The builder may apply the sheets of plywood to the interior of the studs, or install a suitable moisture barrier over the plywood to prevent moisture soaking into the wood. Plywood attached to the interior of studs is well isolated from moisture.

A good quality water-resistant building paper (Grade B), applied weather-board fashion over the plywood is a suitable barrier. If the job is especially critical or is in an area of relatively high rainfall, two layers of water-resistant building paper are recommended.

Care should be exercised during application of the construction paper to avoid tears and perforations that would allow transmission of water to the plywood. Note that the purpose of this membrane is to prevent outside moisture from swelling the wood. Extreme care in this part of the operation is essential to integrity of the structure. Grade D building paper may be used, but is not as resistant to the passage of moisture as Grade B paper.

Also, proper care always should be observed in fastening the building paper to the plywood. Drive the fasteners straight into the backing. If the paper receives a significant perforation or tear, patch the opening with additional water-resistant paper, properly lapped.

Control Joints

The installation of control joints in the lath is especially beneficial when plywood is installed under plaster, because control joints help to relieve and restrict the force of stresses that may cause cracking. In addition, good design would require the installation of weep screeds at the base of the wall and at each plate line of multi-story buildings.

Adequate protection of the plywood may be accomplished upon application of one layer of Grade B building paper applied over the plywood. The layer of Grade B paper may be applied as a separate sheet or attached to and a part of paperback stucco mesh. Some authorities consider application of Grade B building paper and stucco mesh in two separate operations to be preferable, although many satisfactory installations have been done in which self-furred paperback stucco mesh was manufactured with Grade B paper as integral backing. Grade B paper and self-furred expanded metal lath also serve well over plywood sheathing.

For extra protection, one layer of Grade B paper may be applied over the plywood, followed by paperback stucco mesh or expanded metal lath that is backed with Grade B paper. Grade D paper may be adequate in some cases, but does not have the same resistance to the passage of moisture that Grade B provides.

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The Portland Cement Association (PCA) recommendations include: (1) building paper should comply with the current requirements of UU-B-790A, Federal Specifications for Building

Paper, Vegetable Fiber (Kraft, Water-proofed, Water Repellent, and Fire Resistant), (2) for some building occupancies, such as hospitals, building paper must be flameproof, (3) asphalt-saturated building felt should weigh not less than 14 lb. per 108 sq. ft. (6.4 kg per 10m²), and (4) building paper should be free from holes and breaks.

For more complete information on the use of Portland cement-based plaster, consult the *Portland Cement Plaster (Stucco) Manual* published by the PCA, 5420 Old Orchard Road, Skokie, IL 60077, telephone: (312) 966-6200.

Note that we are not advising that plywood should not be used under plaster. Rather, we are advising that problems may arise from its installation under plaster, and are offering suggestions to overcome the problems. It should be noted that additional protection of the plywood, above the norm, increases the cost of the structure, mainly in application labor. The

additional cost must be balanced against the additional assurance of a superior job.

Architects and contractors should also note that many installations built with minimal protection of plywood have performed very well.

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“Through a special donation from the family of John W. Thomson, Jr. the Foundation is developing a single

source publication that will catalog the fire rated wall, ceiling, beams, columns, soffits and fascia assemblies that incorporate Portland cement or modified Portland cement plaster as a component. Walt Pruter of Walter F. Pruter Associates is researching and compiling the data and it is anticipated that the publication will be available no later than this Fall.”

