CRACKS OVER STIFFENER WIRES

The basic cause of these cracks is structural change

Occasionally cracks in cement plaster are observed that are horizontal, are in an essentially straight line for an indefinite distance across the wall, and that, if there are several parallel cracks fitting this description, will be about six inches apart or some multiple of six inches distant from each other measured vertically. Frequently the crack fitting this description may be related to the stiffener wires that are an integral part of self-furred paperback stucco mesh.

Note that I state that these cracks may be related to, NOT CAUSED by, the stiffener wires. Actually, the basic cause of the crack appearing over and in line with a stiffener wire is a structural change; that is, a structural deformation occurring in the building after the plaster has been applied and has set.

The significant force of warping or expanding wood exerted against the horizontal stiffener wires is the basic cause of the cracks, and neither the stucco mesh nor the lather should be blamed for that pattern of cracking.

Quite simply, the delayed deformation or warping of wood is beyond the power of each of us to control. Some pieces of lumber are more prone to warping than others, as the wood dries or cycles through periods of being wet and dry.

Break a Hole

To determine if the described crack is over a stiffener wire, break a hole through the plaster over the crack to the depth of the paper backing. A hole extending approximately one inch on either side of the crack is sufficient for determination.

Here is a description of what the writer believes takes place in the development of this type of crack.

As the cement plaster is applied to the wall over the self-furred paperback stucco mesh, whether applied by hand or gun, the lath and paper backing are bowed inward somewhat between studs. That bowing carries the stiffener wires inward in a curved shape.

Additionally, one frequently finds that the paper backing and wire mesh of the lath bow slightly inward in vertical alignment between the stiffener wires. Note that the horizontal bowing deflects through a distance of about 14½ inches between studs and vertical bowing through a distance of about 6 inches between stiffener wires.

There is absolutely no harm to the plastered wall or loss to the owner of the building because of this phenomenon. Rather, the owner gains by having additional plastered protection between the studs.

Fracture Occurs

Analysis of the situation develops the fact that, if excessive force is exerted by the building per se against the plastered wall, sufficiently to fracture the plaster, the line along which the fracture would be apt to occur would be along the RELATIVELY thinner line of plaster above the stiffener wire. That would occur because the plaster elsewhere in the stucco membrane may be thicker.

It is evident that the plaster will not be fractured along that line unless great force is applied to the plaster either in the plane or at right angles to the plane of the plaster membrane.

One must keep in mind the fact that a crack should develop somewhere in the plaster to relieve the stress of the irresistible force, just as the soil and rocks forming the surface of our earth give under the stress of an earthquake. If it were not for that newly created straight line in the plaster which may not be as thick as the rest of the wall adjacent to the line, a random pattern (Continued on Page 29)
crack probably would develop to relieve the overwhelming stress.

Thus the stiffener wire is a factor only in establishing alignment and direction of the crack. The cause of the crack is the force that produced the stress in the wall.

A description of the mechanics of a typical source of stress follows.

When a stud warps after the plaster has been applied and has set, the wire attached to the warped section of deformed stud will be pulled with great force. As the stud applies tension against the wire, it tends to pull the wire into a straight line.

That realignment of the wire, of necessity, exerts great force against the plaster, trying to pull the bowed back of the plaster membrane into straight alignment, and trying to force an outward or concave curvature into the face of the plaster membrane. Naturally, the plaster resists that force, and if the force is great enough, a fracture occurs.

The fracture is apparent as a horizontal crack that may not vary from a straight line by more than 1/4" to 3/8", if a chalk line were pulled tight along the center alignment of the crack.

Prevention of that type of crack would require that studs not be permitted to warp, or the building not be allowed to subside after the plaster has been applied and has set. The writer believes that none of us have the power to prevent wood studs from warping, based on the knowledge available at this time.

Usually, the force that caused the crack will reach equilibrium after a sufficient period of time has elapsed. At that time, no further change should occur, except the slight change caused by temperature differential in the wall.

When the building settles down to its final, stable configuration, the cracks can be patched successfully. The patching should be done by an accredited plastering contractor.