THE IMPORTANCE OF

GYPSUM BOARD DIRECTION
AND OFFSETTING JOINTS

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Putting a building together from the design stages to the creation of functional space requires that each trade contribute a level of knowledge at the “cutting edge” of their industries’ technology.

Construction is a highly technical industry, and sometimes seemingly minor changes have the potential for monumental consequences. This was vividly and tragically demonstrated on the evening of July 17, 1981 when a devastating failure occurred at the Hyatt Regency Hotel in Kansas City.

The original suspension details of two atrium walkways were “slightly” altered during the construction phase by a change order. The alteration eventually caused a stress failure that resulted in the death of 114 people and injured over 200 others. The litigation and settlement costs of this accident have been enormous and the impact on the entire construction industry without precedent.

Contract language is more explicit...Change orders are more closely monitored...bonding is more expensive...liability insurance costs for design, engineering and general contracting professional have skyrocketed...most jurisdictions have upgraded their plans review process and inspecting authorities’ educational requirements. Doing business is simply more difficult.

The point is that details, no matter how insignificant they may seem, are extremely important to the overall performance of any tested or engineered assembly.

Every day we provide wall and ceiling systems that must conform to code-imposed fire and sound ratings and structural criteria for attachment, suspension, axial and lateral loading. We are not only creating space, we are installing the basic elements of Life Safety, areas of refuge, escape routes and protection of property.

This is an awesome responsibility!

It has been this author’s experience that gypsum board direction of application and the offsetting or proper staggering of joints are the source of more job problems for the wall and ceiling contractor than any other specific detail of application requirements. And, unfortunately, it is one of the most costly for the contractor to correct.

It may be appropriate to start with a review of the definitions of the various terms relating to gypsum board direction and joint locations as they are presently written in the industry application standards and test descriptions:

Parallel - This term means that the long or factory (paper bound) edges are applied in the same direction as the primary framing member. On sidewalls this method could be described as “vertical application,” but the term vertical is not appropriate to ceiling construction and may create confusion.

Perpendicular - This term refers to applications where the long edges are applied “at right angles” to the framing members. On sidewalls this method could be described as “horitzontal.”

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scribe board direction on ceilings.

Staggered Joints - Edges and ends are offset from each other at least one framing space, 16 in. o.c. or 24 in. o.c. based on test details. This refers to boards applied on the same wall side as well as partitions with gypsum boards applied on opposite sides.

NOTE: In multi-layered assemblies it is most important to plan the base and face layer joint locations to offset one from the other. A common error on parallel applications is to end up with all butt joints at one height. This is most difficult to justify to inspecting authorities unless the joints occur above a ceiling membrane.

In general, the gypsum board direction on sidewalls of non-rated or residential construction makes little structural difference. Perpendicular direction is often preferred as it is the stronger orientation and there are fewer joints to finish. On ceilings however, where joints or trusses are often spaced up to 24 in. o.c. and/or the use of water-based spray textures are anticipated, then the gypsum board thickness and direction is extremely important. The charts in Figure A from ASTM C 840 and Gypsum Association literature delineate recommended application standards.

In fire-rated systems the code authorities will require that the assembly be built in the field as it was tested. In most cases gypsum board wall assemblies are tested with the factory edges adjoined over the primary framing members in both wood and metal construction. There are, however, a few specific assemblies where tests have been conducted with the board in either direction, such as WP 1200 and WP 3520 from the current edition of the Fire Resistance Design Manual. The rationale for this application requirement, as demonstrated by the ASTM E 119 standard test method, is that the gypsum core will release most of its chemically combined water, and a slight overall shrinkage occurs in severe temperature exposure. Edges and ends backed by framing members protect the cavity and unexposed surface for an additional period of time.

In perpendicular (at right angle) applications, edge joints that fall directly across from each other may be prematurely exposed to severe temperatures and experience early failure.

In instances when gypsum board has been improperly installed, there are remedies that may be acceptable to the building official, such as:
1. The use of greater stud depth than that which was tested.
2. The addition of glass or mineral insulation in the cavity of certain systems.
3. A greater thickness of gypsum board than that tested, provided that the core is of a rated type formula.
4. Backblocking of the joints with cross framing members.
5. Ceramic tile or other non-combustible wall surfacing material on one wall surface.
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The strategic planning process are congruent with the stated objectives and end results. The ongoing effectiveness of this high performance, high commitment system requires constant planning and interaction among the various teams to achieve optimum quality and profitability on each project.

Sound Leadership: the challenge for the organizational leaders is to continually ask themselves these questions and keep them in the forefront of their thinking:

• Do we want to seek quality in everything we do? • Will we overcome the struggle to move forward rather than return to traditional ways of doing things? • Are we willing to become systematic thinkers and planners. • Do we believe that this management system will make a difference in the marketplace?

If the answer is yes, then the leaders need to understand that they are “buying into” and initiating a redistribution of power, which leads to:

Empowerment: power is extended to people who do the work. Their intelligence is valued, their potential for learning and getting involved is encouraged, and their interest in caring is fostered. Middle and upper management begin to treat people as adults and value them as resources to the success of the company. Delegating responsibility and commensurate authority, expanding employees’ roles and sharing information about the company will foster a management and work system characterized by high energy, continuous learning and quality improvement that becomes an obvious choice for all team players.

The strategic planning process and a management system of achieving organizational excellence through teamwork is a systematic effort by your company to deal with the inevitability of change and to attempt to envision its own future. The importance of this process and the accompanying elements will enable an organization to shape its own future rather than to simply prepare for the future.

About the Author:
Norb Slowikowski is a professional trainer and a management consultant who concentrates on all aspects of Human Resource Development. Norb and his wife, Mary Kay, founded Slowikowski and Associates in 1975.

Since 1982, Norb has worked extensively in the construction industry with a variety of contractors representing diverse trades. He has trained over 5,000 field supervisors and has provided consulting expertise to a number of companies in the areas of management development, organization development, strategic planning, designing performance appraisal/incentive programs and installing new management systems.

References:
1. ASTM C 840, GA 216
2. GA 600, Fire Resistance Design Manual

About the Author:
James L. Houser recently retired from Domtar Gypsum, as Director of Technical Services, after almost 40 years in the gypsum industry. He is the author of the “Glossary of Gypsum Board Terminology,” the “Levels of Gypsum Board Finish” and numerous articles of technical significance.

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The inspecting authority will sometimes accept a letter from the gypsum board producer, independent testing agency or other professional opinions and base their acceptance on evaluations of similarly tested designs. One should not anticipate the success of a job based on convincing the building official that an altered assembly is equal to that which was tested or specified.

Be on secure ground by doing it right the first time. In this day and time, a lack of knowledge is not an acceptable excuse.

There are numerous places where you can obtain excellent educational materials, reference standards, test details and proper installation procedures. Before you start the job, check with the gypsum manufacturer, the Gypsum Association, your local or national trade association such as AWCI or the Foundation of the Wall and Ceiling Industry, etc.

All you have to do is ask!
Incidently, School may end, but learning is a life-long process.

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