

DRYWALL CONTRACTORS ASSOCIATION OF NEVADA

DCAN-SW

Representing Nevada, Arizona, and California

Centerline Cracking - Technical Information

DCAN has published numerous documents on Joint Ridging and Centerline Cracking. Many of these documents served as a basis for future publications on this topic by various other groups. In summary of previous findings with respect to Centerline Cracking, it has been determined that Centerline Joint Cracking is a result of movement typically related to the expansion of lumber materials in response to changes in temperature and humidity - See DCAN Ridge and Crack Booklet, GA 227-13, Countless other studies etc. The Centerline Cracks typically appear in large spanning ceiling locations or center "belly band" wall locations running perpendicular to framing members.

In researching this matter further, DCAN noted that in some of the Centerline Cracked wall locations, the drywall joint tape was easier to remove, than in non-centerline cracked locations. This condition becomes evident when the drywall tape is removed from Centerline Cracked locations and the tape peels cleanly off the drywall substrate.

Listed below are the Facts with respect to the Centerline Cracking and its effect on joint compound and drywall tape:

Fact 1:

If a Centerline Crack appears, this means that the **substrate** (drywall) which the joint compound is adhered to is being gradually pulled apart and **is under pressure and moving** (see **Figure 1**). This fact is evidenced by the following:

1. Centerline Cracks are not present when the home is initially finished
2. Centerline Cracks typically show up months later and get worse as time goes by.

The fact that the elapse of time leads to worsening centerline cracks, and new cracks etc. supports that an increasing pressure is being applied to the joint and other joints in the surrounding area.

3. The Centerline Crack will start small in one joint and continually grow as long as the joint remains under pressure.

This fact is supported by years of research and interviews with home owners and builders who explain that the cracks seems to grow over time.

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4. Centerline Cracks typically appear in the middle of the ceiling or wall first, then move one joint over and so on...

This fact shows that the most force is in the center of the large span. Once the center joint fails, then the joints on either side begin to fail if the pressure continues to be applied.

5. A pulling apart pressure is being applied to create the Centerline Crack.

Figure 1 is a simple illustration of type of force being applied to the factory tape joint that is running perpendicular to the truss.

This fact is evidenced by the butt joints (running the same direction as the truss) not centerline cracking in problem areas. Further, if Resilient Channel is used, the butt joints are subject to centerline cracking, and have centerline cracked, as they are now running perpendicular to the truss.

Fact 2:

If a Centerline Crack appears, the **drywall tape**, which is adhered to the substrate by joint compound, is gradually being pulled apart, and **is under pressure and moving**. This fact is evidenced by the following:

1. When Centerline Cracked joints are examined under an electron microscope, the drywall joint tape paper fibers appear elongated (stretched apart) from center. This supports the type of pulling apart force shown in Exhibit 1.
2. The drywall joint tape in some of the homes with Centerline Cracking has literally been torn in half (down the center crease) prior to removing the sample for examination. This is conclusive evidence that supports the type of pulling apart force shown in Exhibit 1.

In fact, if enough pressure is continually exerted on any Centerline Cracked joint, the drywall tape will reach a breaking point and tear apart in nearly every instance (assuming the joint compound has sufficient strength to hold the tape to the drywall prior to breaking loose).

Fact 3:

The typical binder system in joint compound will be compromised and degraded if subjected to movement and force over an extended period of time. This fact is evidenced by the following:

1. The binder system in joint compound materials is not designed to accommodate movement and force. These products will flake off, crack, or otherwise fail if subjected to movement and force that exceeds the cohesive limit of the binder system. This is evidenced by the fine cracks that will appear after a minor earthquake, or by the Centerline Crack appearing in the first place.
2. As the drywall is pulled apart, and the fibers in the drywall joint tape are stretched, the bond between the joint compound and these materials will be weakened. This concept can be easily understood by considering how masking tape is removed. Masking tape will stick until someone pulls it with enough force to break the bond loose from whatever it is attached to, or it will come loose if whatever it is attached to starts to move or separate etc.
3. Drywall face paper and joint tape do not have any adhesive properties. When the joint is taped, the joint compound is the only adhesive in this system (like the glue on masking tape). As the drywall is pulled apart, and the paper fibers in the tape are stretched, the adhesive (joint compound) gradually begins to weaken and will degrade over time when under force, which often results in the clean peel off described above.

Conclusion:

It is a documented fact that Centerline Cracking is a result of movement that creates a pulling apart pressure on the drywall joint, which in turn stretches the drywall joint tape, and begins compromising the adhesion between the drywall face paper, joint compound, and paper tape. This gradual process can lead to Centerline Joint Cracking and clean peel tape at Centerline Cracked locations and other areas under stress in the home. Because of this situation, DCAN recommends removing any tape / compound with compromised bond prior to repairing the joint. This is a similar logic to a painter making sure to scrap any loose material prior to repainting.

Joint compound and paper tape will not hold a house together and will fail when subjected to enough pressure and force over an extended period of time. Builders and subcontractors in climates subject to large changes in temperature and humidity should take preventative measures in large spanning areas such as the use of Resilient Channel, use of treated lumber, or conditioning homes during and after construction to mitigate these issues.

These problems are not a drywall installation or material defect, rather they are a result of movement typically related to the expansion and contraction of lumber, therefore they are not subject to warranty by the material manufacturer or drywall subcontractor.

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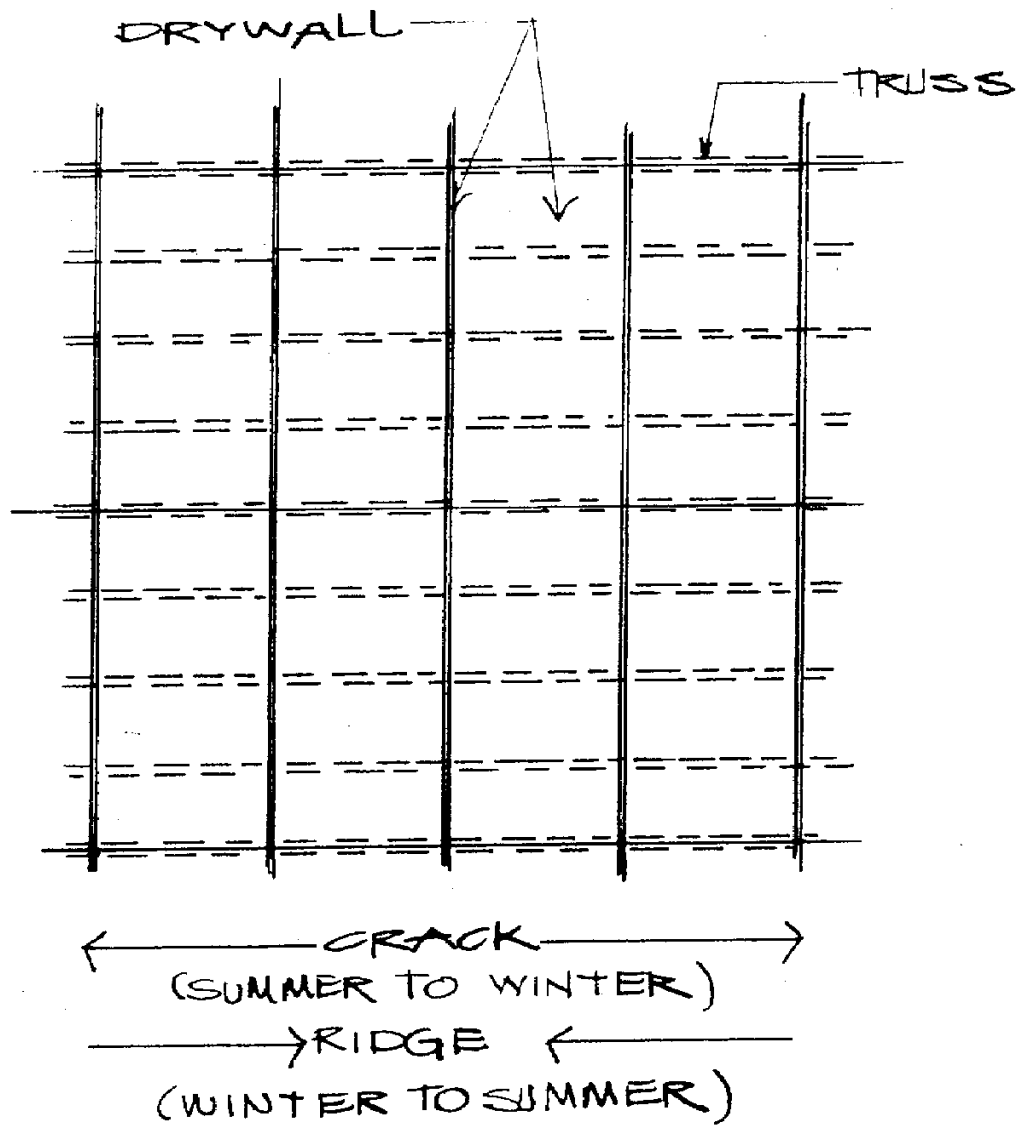
Figure 1

Illustration of Truss Expansion / Contraction

Homes Framed in the Summer Have a Lower Moisture Content

Homes Framed in the Winter Have a Higher Moisture Content

Change of Season Shown Below



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