



**SAUNDERS**  
COMMERCIAL SEISMIC RETROFIT  
www.saundersseismic.com

Saunders Construction, Inc.  
California License No. 616856  
Washington License No. SAUNDC1953ND  
Nevada License No. 68730

Corporate Office:  
1760 Monrovia, Unit #A-1  
Costa Mesa, CA 92627  
Phone: (949) 646-0034  
Fax: (949) 631-2119

Northern California Office:  
3710 A Charter Park Dr.  
San Jose, CA 95136  
Phone: (408) 267-3876  
Fax: (408) 267-3870

Seattle, Washington Office:  
Phone: (206) 521-3774  
Fax: (206) 521-3775

## WHAT YOU DON'T KNOW MAY COST YOU!

**Roof condensation** is moisture that develops at the roof ceiling area and is trapped by foil insulation or other types of radiant barriers. **IF LEFT UNTREATED, IT CAN DESTROY THE ENTIRE ROOF STRUCTURE!**

### HOW DOES IT FORM?

In most cases, there is a vapor retardant, usually a foil radiant barrier or R-11 faced fiberglass batt, attached to the sub-purlins and in some cases wrapped around the purlin beams at the underside of the roof structure. In some buildings, you will see batt insulation covered with foil insulation--one of the worst scenarios.

As the building heats up during the day and the roofing material (especially dark roofing) absorbs the sun's rays, heat is created in the air cavity between the insulation and the roof. This area can achieve a temperature 50 to 70 degrees warmer than the rest of the building. Hot air increases the evaporation of the ambient water molecules, drawing moisture into the air cavity. Because of the insulation, the individual roof cells (the area between the foil and plywood roof, usually constructed of 2x4 sub-purlins) are not able to vent and dry out. When the building cools off, the cavity cools and the trapped water condenses and seeps into the wood roof members. Until corrected, the building cycles through this process day in and day out. There are factors can intensify the condensation process:

**Roof Leaks**- Allows water to enter the building.

**Building Construction** - Lumber utilized in construction often has a moisture content of 19% or more. If it is not allowed to dry out before the insulation is installed, excessive condensation can occur.

**Occupant Operations** - Boilers, foam production, bakeries, and similar operations produce additional moisture in the roof cells. A tenant may induce condensation damage by sealing the vented skylights, closing the HVAC economizers, by preventing ventilation at the roof line, keeping the building closed up, or by building full height walls inside the structure. Some tenants install their own foil insulation or overload the roof from above, increasing the likelihood of condensation related damage. Extended vacancies leave a building un-vented and cause additional moisture buildup as well.

# Does one of your properties suffer from roof condensation?



#1

#1- Look for black streaks caused by iron in the purlin hangers.



#2

#2- Gang nail plate stamped for trusses- notice most of the rusting above the old foil line. These plates are very thin and stamped when made so they cannot withstand any rusting.



#3

#3- Sub-purlin hangers- These are made from an aluminum alloy and do not rust like metal hangers.



#4

#4- Look for black streaks caused by iron in the GLB (Glue-Lam-Beam) hinge connection.

## If left untreated can the problem get worse?



#5



#6

#5&#6- These pictures show what to look for when looking from the ground. All the black streaks indicate the metal hangers are rusting and with this much evidence the sub-purlin hangers are sure to be corroded even though they are covered over by the foil.

The property management and due diligence teams need to know what to look for. Be an asset to the owners and cure the problem before it causes an injury and expensive repair cost. If caught early it can cost as little as .25 cents per square foot. If left untreated it can cost up to 10.00 dollars per square foot to repair.



Close up pictures of rusted purlin hangers.

## Repair Solutions:

Repair sub-Purlins with 2x4 ledger.



# Repair of Purlin Hangers

New custom retrofit hanger



Fabricated Angle Bracket

Saunders Construction, Inc. 949-646-0034

