Spray Foam 2009
Technical Sessions

FOAM BLISTERS
CAUSES & CURES

Presented by: Lyle Orth
Cool-Roof Systems
FOAM BLISTERS

Key Learning Points

A. How are blisters classified?
   a. You’ll be able to classify the blister to determine the cause and proper repair & prevention methods.

B. What causes foam blisters?
   a. You’ll understand the most common causes of foam blisters.

C. How Can I prevent this from happening?
   a. You’ll know you can’t prevent them all, although, you can greatly reduce them.

D. How should I fix the Foam Blister?
   a. You’ll know what the SPFA’s recommendations are and that you should contact the Manufacture for their specific procedures.
Type A. ---

**Interlaminar- Top Lift:**
A separation between the top layer or lift of SPF and the lift beneath it. These are generally small in size, typically 50mm – 300mm (2 inch -1 foot) in diameter. They are easily broken when touched or stepped on. Typically they often show separation of the top layer of SPF with a thickness range of 3 mm- 9 mm (1/8 inch to 3/8 inch).

(Think thin passes over the whole roof or on a small area for “dress-up” reasons.)
FOAM BLISTERS
Type “B”

Type B. --- Interlaminar Intermediate Lift: A separation or de-lamination between layers or lifts of polyurethane foam that are not the top lift. This type of blister is somewhat larger than Type A, ranging in size usually from 150 mm to 1000 mm (6 inches to several feet) in diameter with a thickness of 25-75 mm (1-3 inches). In some cases Type B blister could be up to 9 square meters (one roofing square) or larger. These blisters are somewhat less flexible and not easily broken. Test cuts show de-lamination between layers other than at top two layers.

(Think thicker multi-pass foam applications.)
FOAM BLISTERS

Type “C”

Type C. ---Substrate Bond Line: These blisters are about a meter (several feet) in diameter or larger but readily observed by visual inspection. They are rigid and usually detectable by movement when walking on the surface of the roof. These blisters reflect a loss of adhesion of the sprayed polyurethane to the substrate.

(Think larger blisters that are relatively strong but still breakable if you try hard.)
FOAM BLISTERS
Type “D”

Type D. --- Intra-Substrate: Similar to Type C, as they are very rigid and not readily detectable by visual inspection. These type blisters are often large (9 square meters [one roofing square] or larger) and located between felts or other components of the original roof.

Can occur in just about any recover application over an existing BUR, single Ply, BUR Gravel and modified bitumen systems.

(Think large raised areas on a flat roof. Like the roof has raised an inch or two over a large area.)
FOAM BLISTERS
“The Cause”

- MOISTURE:
  - Dew
  - Condensation from A/C equipment
  - Sweat/Spit
  - Gun Air Supply

- Other Fluids:
  - Oil
  - Grease
  - Solvent
  - Fuels

- Phasing:
  - Same day - full thickness only
  - Same day – ½ day exposure
  - Shows up years later or now

- Debris:
  - Dirt
  - Dust
  - Gravel
  - Tree leaves/needles
  - Trash

- Overspray:
  - Foam; Latent “A” material due to spits from the foam gun.
  - Uncured coating sprayed in the proximity of the foam application.

- Degraded Foam
  - Over oxidized foam that has too much UV exposure.
  - Some one walks on “green foam”
FOAM BLISTERS
“The Most Causes Explained”

• MOISTURE:
  • Most Common is Dew
  • Human Body Fluids, Sweat, Spit
  • Mechanical such as A/C units and Gun Air
  • High Vapor Drive such as a indoor pool or hot tub.

• OTHER FLUIDS:
  • Gun oil
  • Grease (Fusion)
  • Off ratio foam (First shot out of the gun, run out of material
  • Non-curing “Wet App” patching materials.
FOAM BLISTERS
“The Most Causes Explained”

- Debris:
  - Dirt
  - Trash – Masking tape
  - Leaves or Pine Needles
  - Foam Trimmings
  - Dust
  - Excess loose gravel

- Overspray:
  - Latent “A” material due to foam gun spits or at lap/pass lines. (This occurs in almost all applications particularly with non-direct impingement guns)
  - Uncured coating passes in the proximity of the new foam spray.
FOAM BLISTERS
“The Most Causes Explained”

- **Degraded foam:**
  - Over oxidized foam due to excessive UV exposure.
  - Damage caused by someone walking on “green foam” (While the foam is still soft, tends to leave a footprint.)

- **PHASING:** (Application of additional foam to a section completed on a previous day, without primer or preparation.)
  - May void your warranty from the Manufacture
  - May blister now or years later.
  - Rare, but can occur on same day applications in the Southwest.
FOAM BLISTERS
Prevention Suggestions

- Most Type A & B Blisters are Applicator ERROR!!!!
  - THIN PASSES, especially with dark coatings
  - Starts spraying before dew is burnt off.
  - Starts spraying before primer is dry.
  - Starts spraying when the humidity is too high.
  - Has drinking water in the application area.
  - Sprays off-ratio foam (run-outs, circulation, pumps)

- Prevention:
  - Foam in all crickets and correct ponding issues before applying the Final Pass.
  - Check the moisture content of the roof/air before starting the foam application.
  - Make sure the dew and/or primer has completely dried.
  - Have plastic/paper on the roof for working on the guns.
  - Keep water jugs out of the application area.
  - Know the Manufacturers Heating Recommendations
  - Take care of your equipment!!!!!!!
FOAM BLISTERS

Prevention Suggestions for Type C Blisters

- AGAIN, Most Type C Blisters are Applicator ERROR
  - Improperly prepared Substrate: Dust, Gravel, Oil Film, Soft Mastic
  - Moisture trapped in the existing roofing system
  - Previously applied coating is poorly adhered.
  - Wrong or no primer
  - Sprayed over asphalt based Aluminum coatings
FOAM BLISTERS
Prevention Suggestions for Type D Blisters

- May not know that you have a blister until after the foam has been installed.
- Verify existing roofing material is secured to the deck.
- Add simplex type nails or screws and plates in a 5 point pattern if in question. (Use the screws and plates on occupied buildings.)
- Consider potential vapor drive.
FOAM BLISTERS
Fix it or Leave it????

- Type A Blisters should always be repaired as soon as possible. (Make sure you cure the cause)
- Type B Blisters:
  - If there is traffic on the roof, fix it.
  - No Traffic, you may want to leave it.
- Type C
  - Typically left in place. Repair in there is heavy traffic.
- Type D
  - Typically left in place.
QUESTIONS