

ROOFING REALITIES NESEA March 2016

We need to realize that roofing systems handle multiple tasks beyond keeping water out:

- AIR
- VAPOR
- WIND
- RAIN
- HEAT
- COLD
- EXPANSION
- TRAFFIC

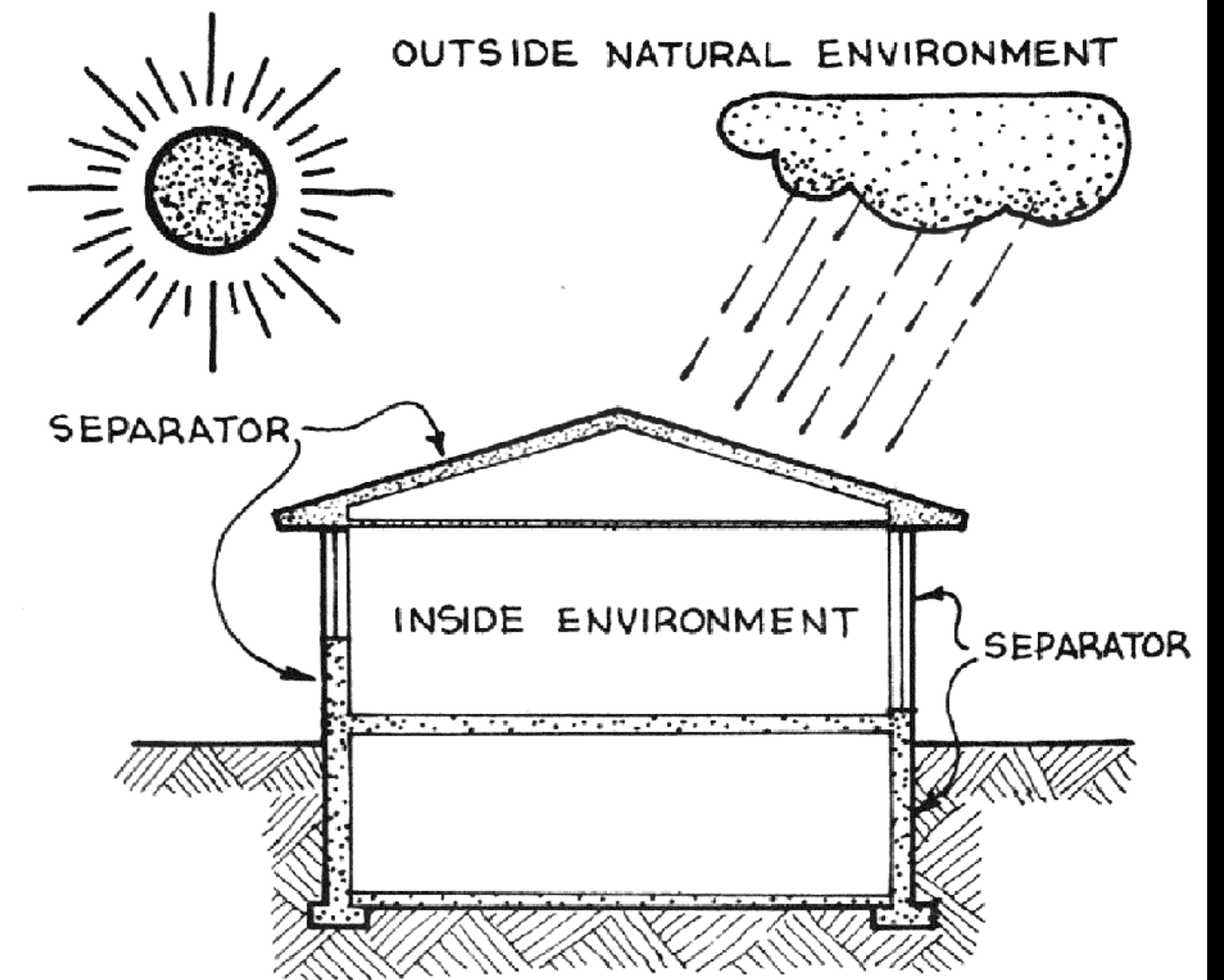


Figure 1-3. Roof with walls are environmental separators.

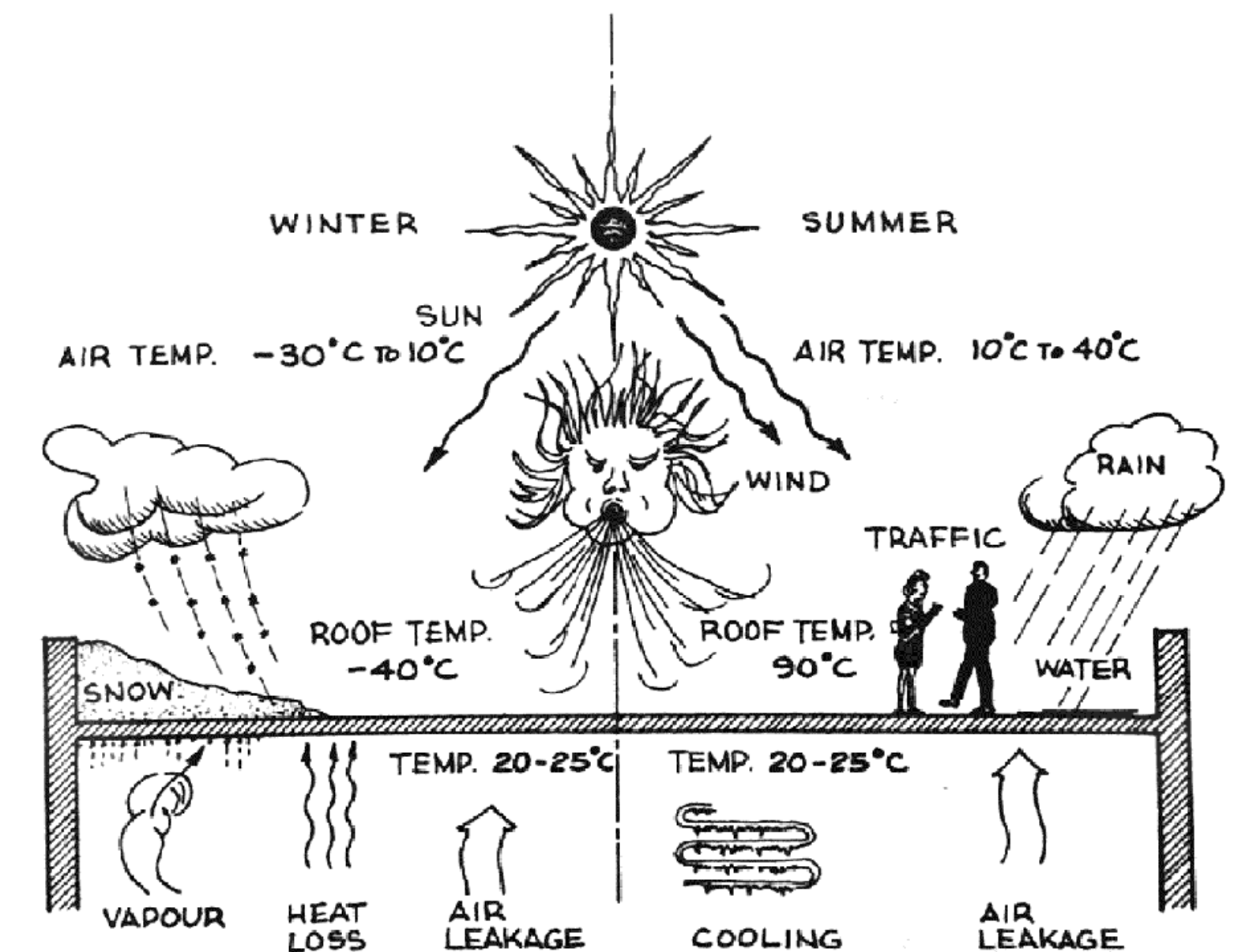


Figure 1-4. Factors of inside and outside environments.

IT'S ALL IN THE DETAILS



The roof and roof edges are the most critical points of any good design. How you deal with the roof edge and the connection to the building is very important.



Failure at roof edge caused the wall to rot.

LOOKING AT LONGEVITY

- **HOW LONG WILL THE ROOF LAST?** The answer is simple. No one knows. Manufacturers make one claim and roofing contractors make another.
- **INCREASE THE LIFESPAN** of the roof. Use best practices and build the following into the budget: adequate supervision and frequent inspections of the work in progress.
- **IT MAKES FINANCIAL SENSE** to invest in high quality details in order to achieve longevity. A roof is a substantial investment. We want to make it last a long time.
- **LONGEVITY = SUSTAINABILITY.** Increasing the lifespan of roofing system is part of sustainable practice.

Table 1 - Ranked Low-sloped Roofing Durability (2005) and 1995 Survey Data

		2005 DATA		1995	
DATA					
Series	Low-sloped Roofing System	Mean	Min.	Mean	Min.
1	Metal panels – copper Metal panels – stainless steel Metal panels – Terne Metal panels – zinc	40	28	25	12
2	Metal panels – aluminum Metal panels – aluminized steel Metal panels – Galvalume BUR – gravel-surfaced pitch – tar/organic felts Metal panels – galvanized steel	25	14	22	12
3	BUR – gravel-surfaced pitch – pitch/glass felts BUR – gravel-surfaced asphalt glass plies SBS modified pitch – multi ply SBS modified asphalt – multi ply BUR – gravel-surfaced organic felts	18	10	17	8
4	APP modified asphalt – multi ply Evaloy PVC alloy – reinforced EPDM Ketone ethylene ester (KEE) – reinforced Poly (vinyl chloride) – reinforced	16	9	14	7
5	Granule-surfaced APP modified pitch BUR – unsurfaced asphalt glass plies Thermoplastic polyolefin (TPO) – reinforced Hypalon (CSPE) and PIB Spray urethane foam – coated	14	7	12	5

The late, great, Carl Cash's survey done in 1996 and again in 2005 on the longevity and cost of low slope roofing systems.



Look OK? It lasted 13 years.....



Rotted wood deck due to the improper base flashings.
Leaking parapets *and* unprotected coping stones are to blame.

Useless base flashing! No waterproofing at coping. Large amounts of water enter the structure through unprotected wall coping.





DESIGNING AND SURVEYING A ROOFING SYSTEM

- Design for climate and location. Use proven, time tested products that work in the specific climate.
- Survey the existing roof and building to determine what is needed.
- Consider the overall condition of the existing building and parapets or walls.
- Properly detail roof drains, skylights, curbs and penetrations.
- Consider railing systems, coping stones and cladding.
- Use liquid applied components.
- Include adequate inspections and supervision in the budget.
- Check for reasonable pitch.
- Get insulation into the equation.
- Involve the roofing manufacturer early in the design process.
- Understand how the roof will be used and abused.
- Emphasize a sensible maintenance plan (it won't be followed anyway).

This is a **failure of a roofing component** *not* the masonry wall. An incredible amount of water enters buildings through unprotected parapet caps. Coatings are *not* a solution when something else is wrong in the assembly.





This is elastomeric *vapor open* paint working exactly as it should - it keeps the water out but also **keep it IN!**

This wall has been **in failure** since it was built in 1994.



Cladding solves the problem. Maybe not too attractive but the wall is insulated and dry.





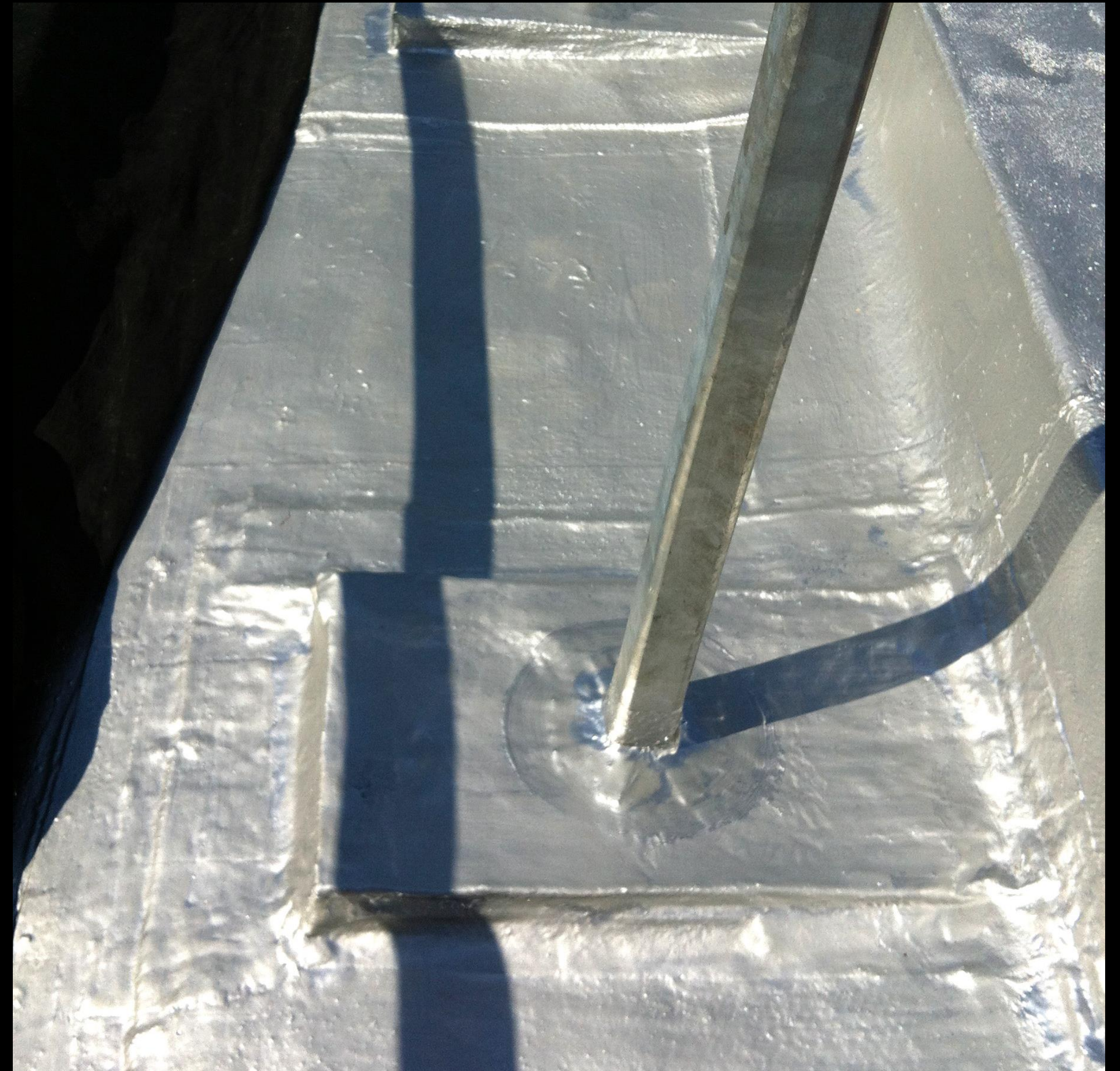
Typical Railing Details. Poor design. Poor execution. Lack of maintenance.





One Large Connection Point.

No outriggers. No pitch pockets. No maintenance issues. Long term durability



Two coats of liquid roofing applied over post base and over entire new roof membrane. **Building in longevity.**

Rebuilt masonry parapet with peel and stick membrane under aluminum capping and core drilled posts.

All steel was prefabricated and then sent to galvanizer and bolted together on site. No welding on site.





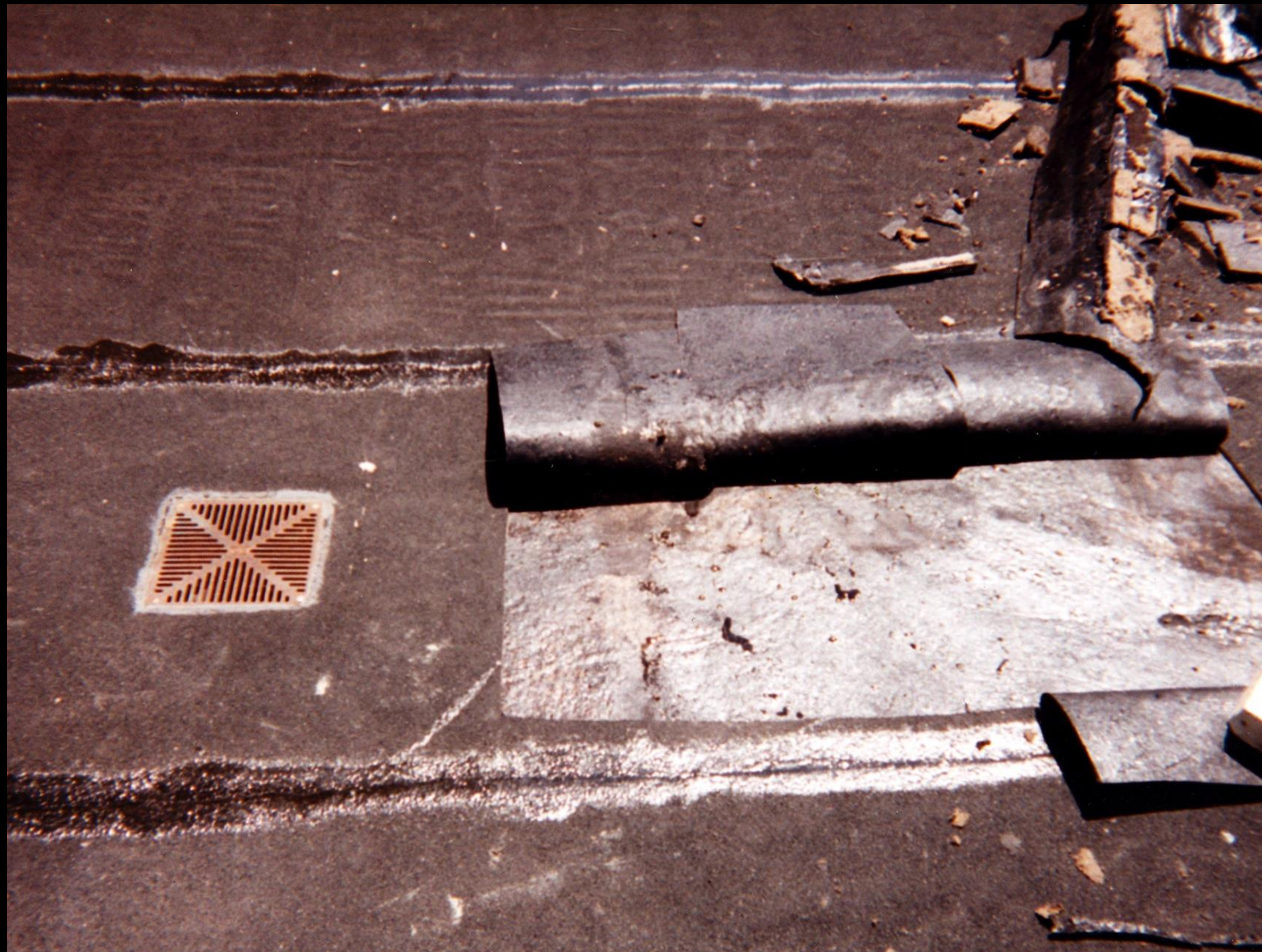
Less expensive detail. New railing posts in solid masonry. Liquid applied membrane eliminating pitch pockets.



BEFORE

Over-ventilated, galvanized skylight versus skylight with integral insulated aluminum clad curb, custom sizes and accurate ventilation.

..... AND AFTER



Improper roof drain leading to premature roof failure at 3 months!

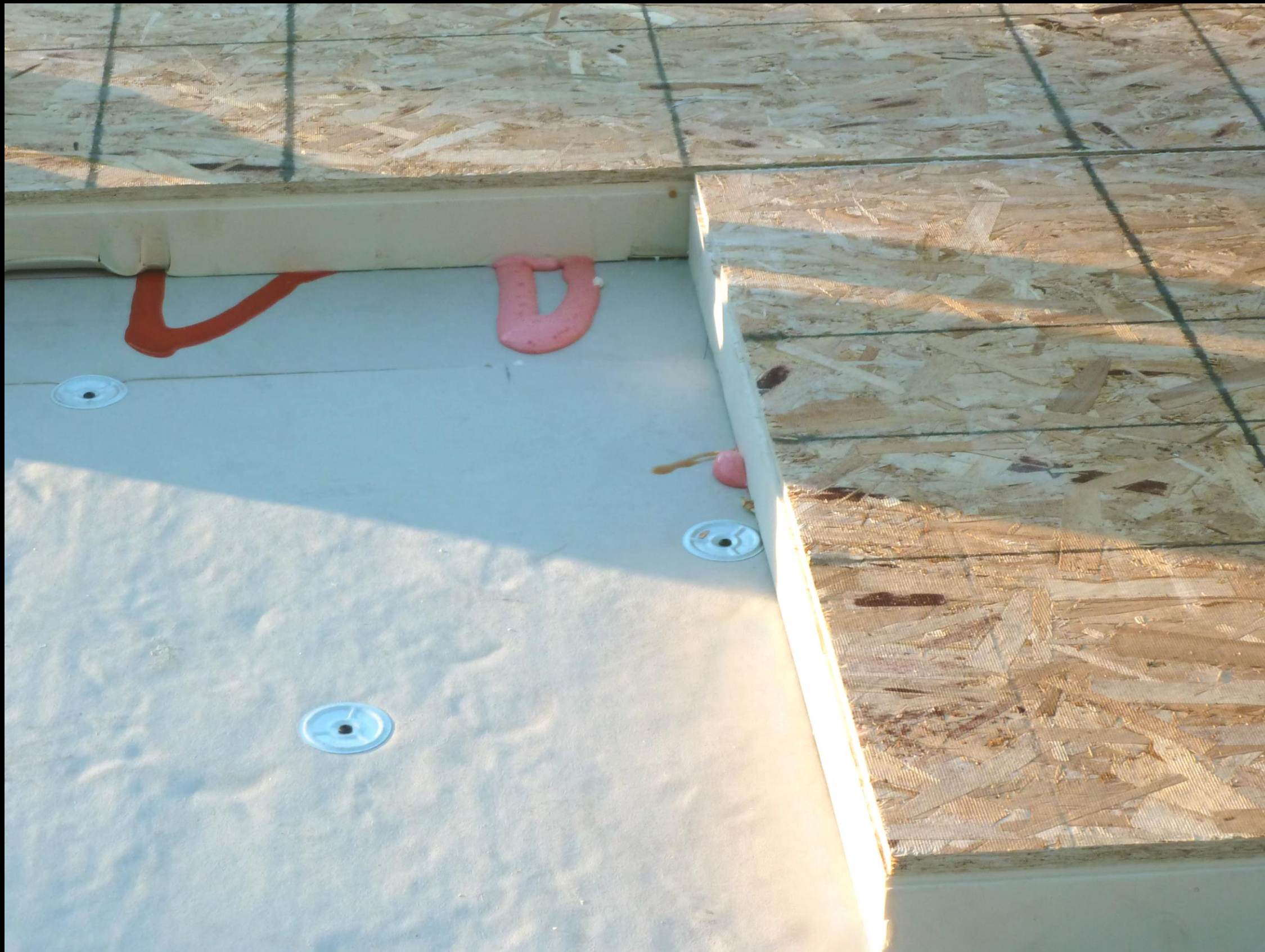


Changing the roof drains as part of a retrofit. **Sensible Practice.**





Bring Insulation into the Equation.



We have many options for insulation. Always use multiple cross laid layers. Adding insulation increases the deck height so consider the extra cost involved in raising guardrails especially in a retrofit situation.

When replacing a roof on an existing building with little, or no insulation in the roof cavity, I don't focus on "R" value. Does it matter?



Find the high point and make sure that it pitches to drain.



Sheet goods laid shingle-style to drains in both directions



Liquid applied flashings mean no more “bitumen origami” at all the detail areas. Manufacturers realize the value of designing the liquid applied flashings into their specifications.



Extending the life of membranes by
applying coating systems.

Are we are heading there?





MAINTENANCE CAN WORK. New roof completed in 2007. Exposed membrane over 6" XPS.

Coating was applied in 2008. This photograph was taken in July 2015.

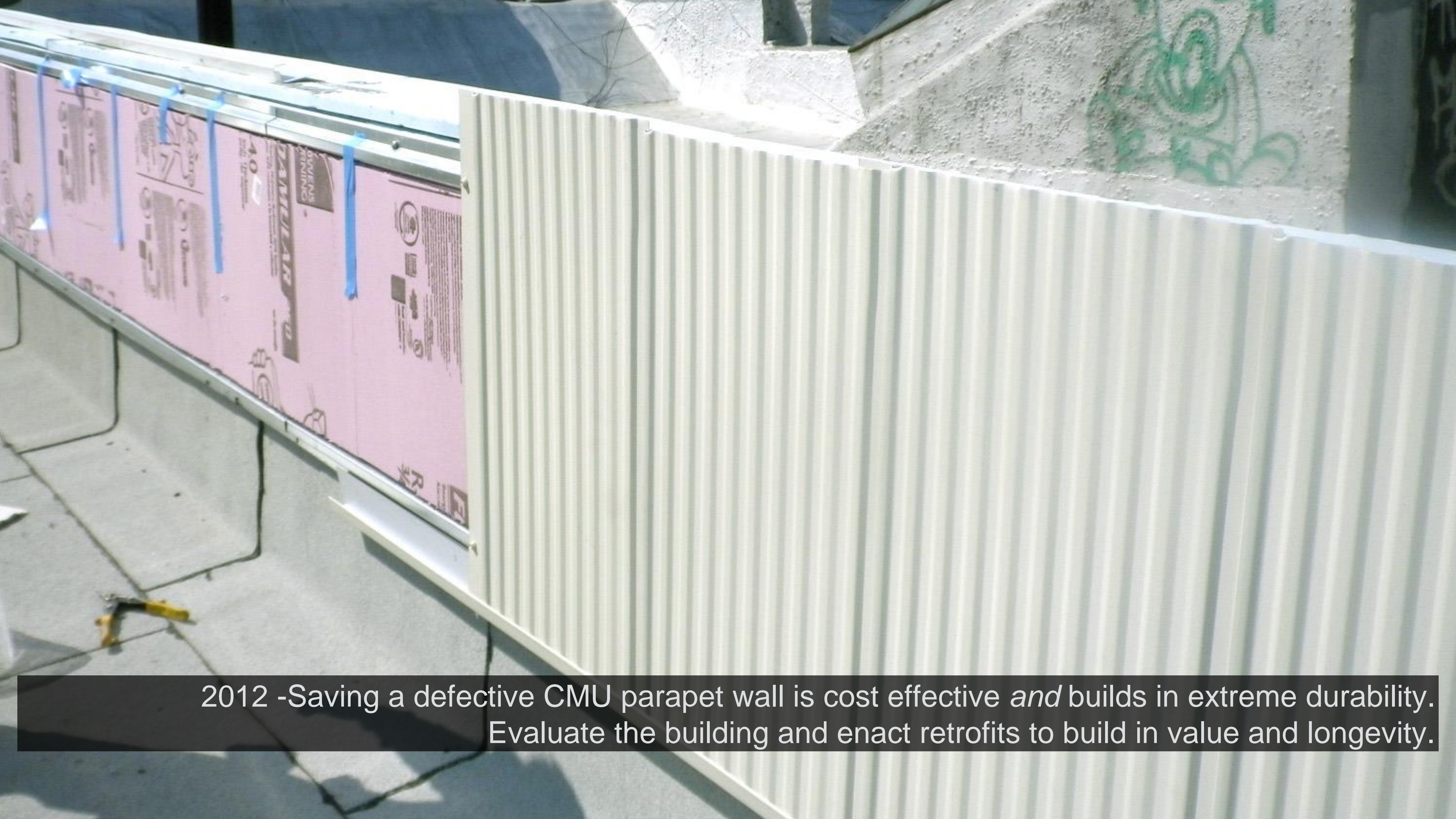
TALK TO THE MANUFACTURER about the coating materials they will allow to be applied on top of their membrane.

MANAGE MAINTENANCE. This roof got a head start by using a paint on coating to extend the life of the system.

Put it in the specification!



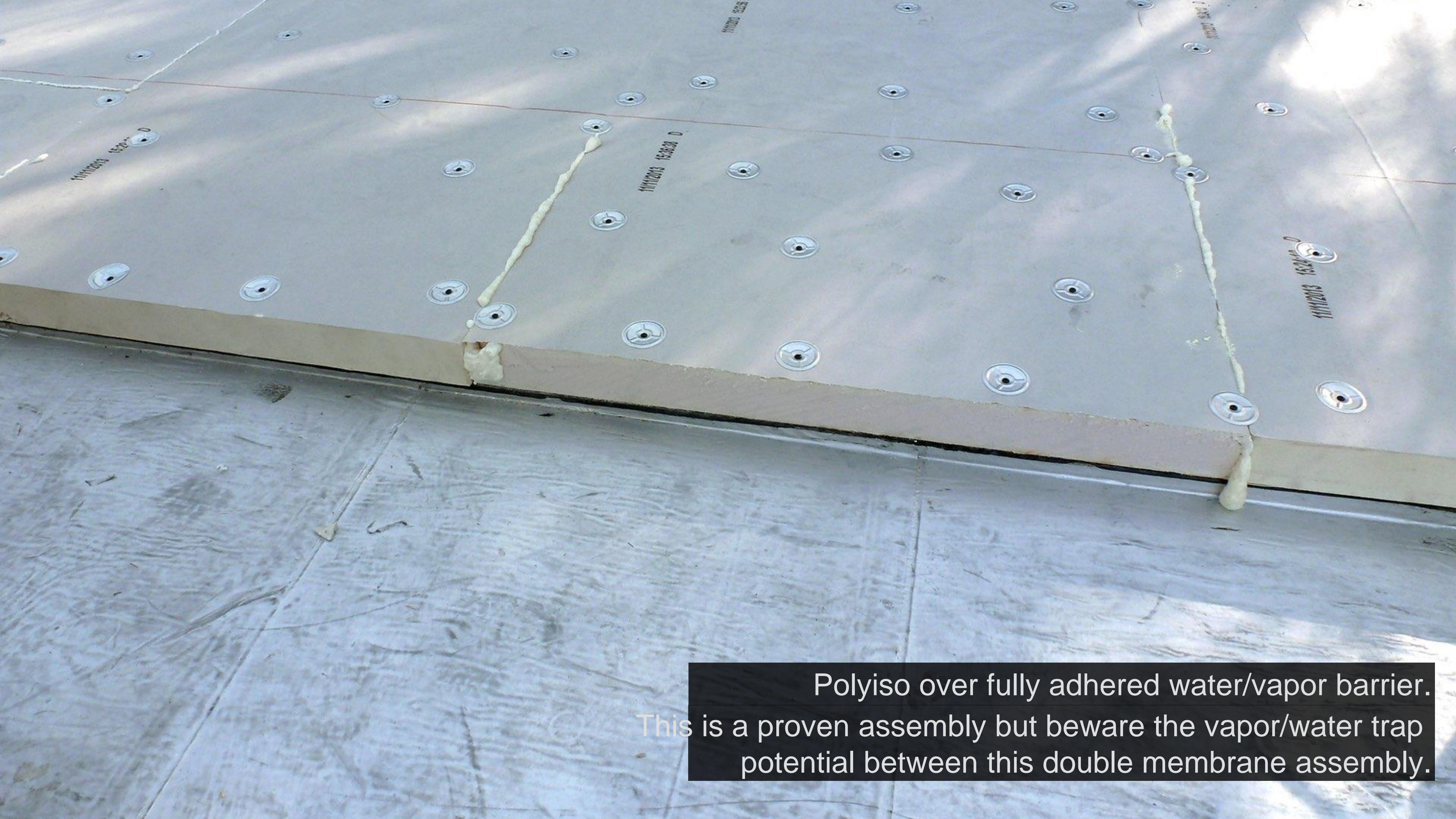
Cladding and capping systems as part of the roofing system allows the elimination of problematic traditional wall flashing.



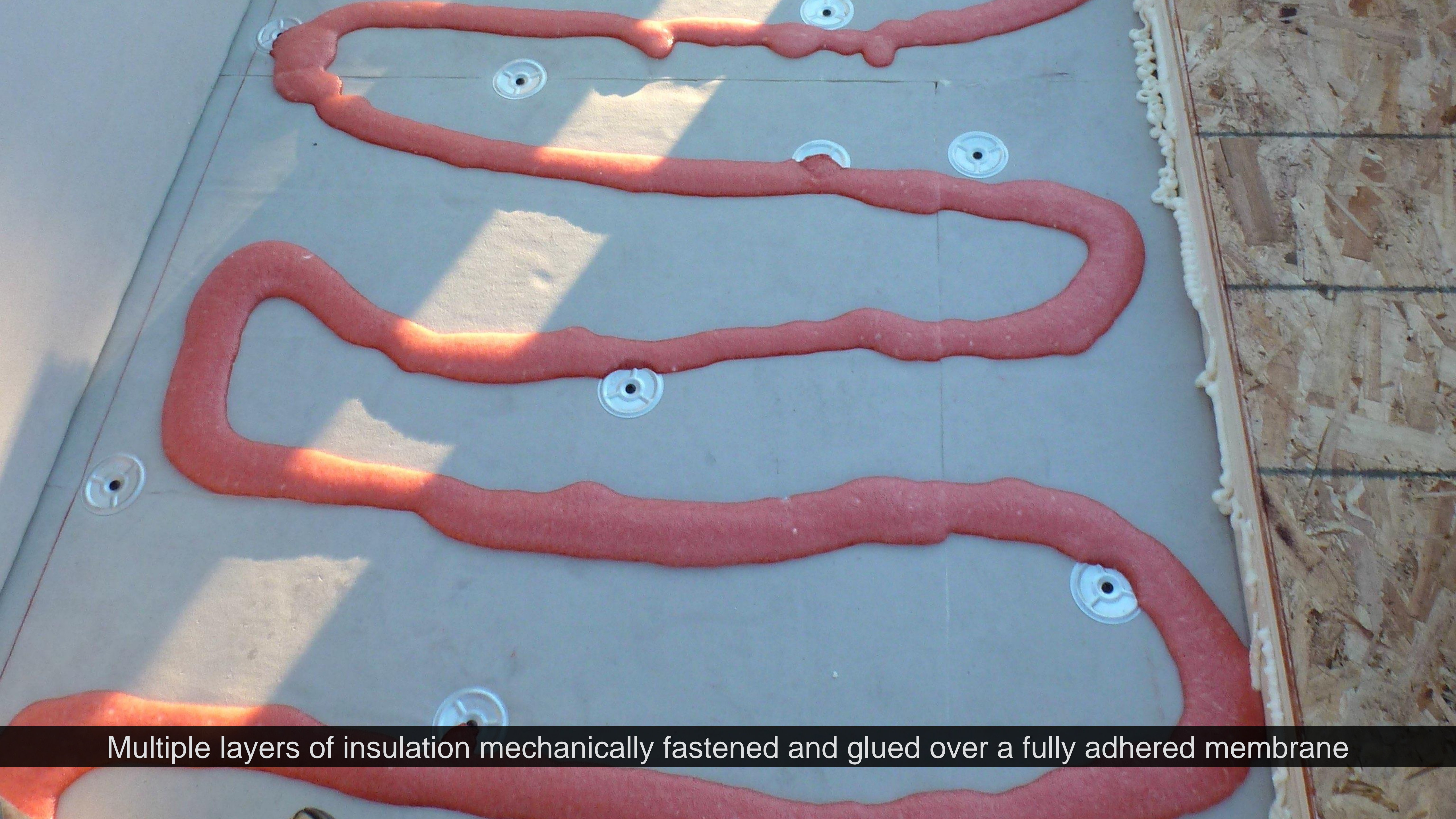
2012 -Saving a defective CMU parapet wall is cost effective *and* builds in extreme durability.
Evaluate the building and enact retrofits to build in value and longevity.



Compact Insulated Double Vapor Barrier. Unvented Roof. Assembly Insulation.



Polyiso over fully adhered water/vapor barrier. This is a proven assembly but beware the vapor/water trap potential between this double membrane assembly.



Multiple layers of insulation mechanically fastened and glued over a fully adhered membrane



Finished Product. A seamless, very low slope, compact, non-vented roof.

A double vapor barrier roof assembly circa 1975, by Max Baker, master of roofing and building science.

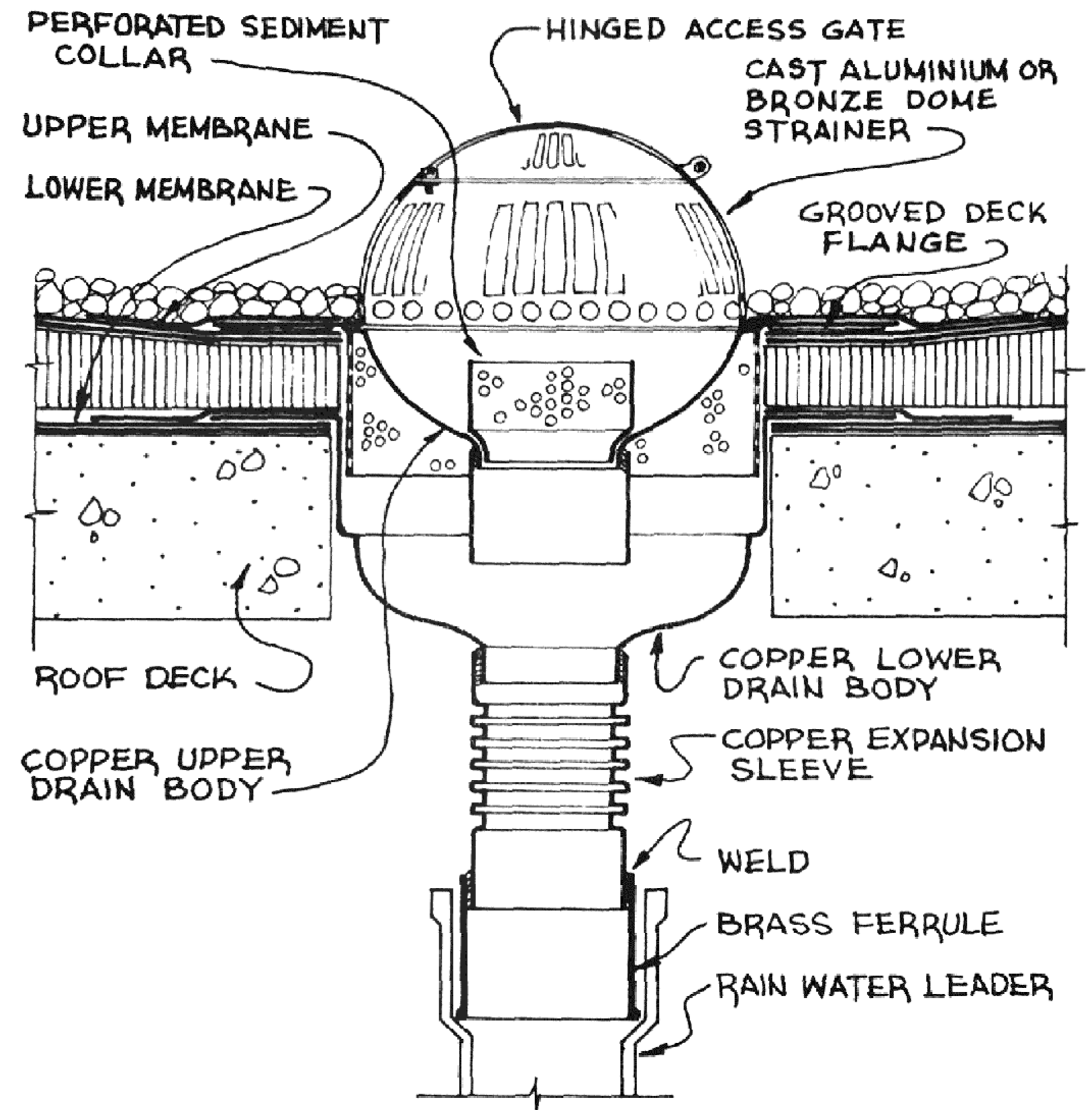


Figure 7-15. Two-part copper drain for drainage at both membranes of a double membrane roof system.

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