

TEMPLAR KNIGHT CHRONICLES

WHY ROOFING AND WATERPROOFING SYSTEMS FAIL

**NORTHWEST
CONSULTING &
INSPECTIONS INC.**

NEWSLETTER

Specializing in the Roofing and
Waterproofing Construction Trade

NEWSLETTER

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Why premature roofing and waterproofing failures are caused both by economic and technical issues. Economically, a building's roofing and waterproofing systems lag far behind the more architecturally higher-profiled building subsystems competing for the building owner's money. Pennywise and dollar foolish decisions underlie many premature failures, whether through ignorance, carelessness, or sheer lack of knowledge many roofing and waterproofing systems designers and building owners refuse to pay attention to the systems performance in relations to the life-cycle costing.

Technically, the issues contributing to premature roofing and/or waterproofing failures can be listed as follows:

The special requirements of the different building components and their performance.

Configuration of new materials

Complexity of the systems design

Field installation problems

The future trend toward more flexible buildings

The exterior of the building must withstand a wider range of attacks from natural forces than any other building components. In some parts of the United States exterior surfaces experience annual temperatures changes exceeding 200 °F and daily changes exceeding 100 °F. These temperatures changes may occur rapidly. In the summer, showers may crop up suddenly cooling the sun baked exterior surfaces. Solar radiation heats the exterior building components to extraordinary temperatures. This heat greatly accelerates photochemical deterioration. Rain, sleet and hailstones pound the surfaces. Other forces such as airborne pollutants and fungus can contribute to the accelerated deterioration.

Configuration of new materials such

as framing assemblies, decks, insulations, vapor retarders, sealants, membranes and flashing materials used in countless combinations has compounded the field installation process and the designers' job of evaluating durability. Until a material has been field tested in service, its durability remains unpredictable.



Accelerated laboratory tests are assisting in the pre-evaluation process, but in-service performance is essential for proving a materials durability. Some materials enter the construction market lacking even laboratory testing. This is getting better but still becomes a challenge in ensuring the life-cycle costing process.

Many products prove disastrous when incorporated with other incompatible materials or system configurations in conjunction with the other building components.

A designer must never consider a building component in isolation. They must always investigate its compatibility with other materials and its effects on the whole system. More important than the quality of the individual product or materials are their design and installation as a compatible component of an integrated

building system.

Expanding plan dimensions are another source of conditions in construction. Its greater size alone makes a larger building more complex technically than a small building. A structure more than 300 feet long generally should have one or more expansion joints to accommodate thermal contraction and expansion. While, a structure only 100 feet long should require no expansion joints. Building components fail from movement of poorly designed components. This condition occur more frequently in larger structures because the individual systems have a greater area to move which produces stress concentrations.

Despite problems of bad design, poor field work still accounts for most of the construction process failures according to the majority of construction experts. Some contractors ignore the specifications, if they even take the time to read them. Design errors rank next, with structural deficiencies and product failures further down the list.

We have found that financial pressures cause most faulty fieldwork. Under the threat of liquidated damages extracted by a building owner if the project is not completed on schedule, the general contractor often persuades the subcontractors to install materials before the other trades are ready, or in damp, rainy, or severely cold weather conditions.

These conditions contribute to systems failure and reduced life cycles.



INSPECTORS HAVE THE MOST DEMANDING JOB IN CONSTRUCTION

The envelope (roofing, exterior walls, basement) of the building is the most problem prone building subsystem manufactured on the jobsite. The most intricate work, such as air conditioning and heating equipment or elevator controls are done in a shop or factory. But the envelope of the building is custom built in most cases in

C O N S T R U C T I O N I N S P E C T I O N

the field. Regardless of the quality of the component materials, the building's integrity depends totally on good fieldwork. For the inspector a good start is critical. Firmness at the start establishes the right attitude, with one-tenth the effort required to rectify a bad start. Once poor work has been tolerated even for a short time, it becomes hard to correct.

The inspector should know the specifications and details before setting foot on the site. Nothing will destroy a person in the trades respect for an inspector quicker than an early display of lack on knowledge or ignorance. The overeager inspector who acts on

uncertain knowledge and then has to back down has a uphill battle for the rest of that project. To eliminate any confusion, conduct a pre-installation conference that includes the inspector, the owner's representative, general contractor, the appropriate trades involved, and materials manufacturer a few days prior to the start of project.

**I N S P E C T I O N
T O O L B A G**

Additional Inspection Equipment to Carry in Tool Bag:

- Hard Hat
- Safety Harness
- Field Reports
- Writing Instrument
- Moisture Meters
- Capacitance Testers
- Infrared Thermometer
- Digital Camera
- Long Level
- Straightedge
- Whisk Broom
- Flashlight

**N C I ' S 8 S T E P
A P P R O A C H**

- Step 1 Exterior Assessment
- Step 2 Interior Inspection
- Step 3 Roof Deck Check-Up
- Step 4 Roof Assembly Confirmation
- Step 5 Roof Surface Examination
- Step 6 Flashing Analysis
- Step 7 Penetration Examination
- Step 8 Perimeter Form & Function

SPECIAL NOTE:

The envelope of the building is structurally secured by the framing assembly, providing flexibility in weight, size and configuration of the envelope system which acts cohesively as a barrier, protecting interior areas from water and weather intrusion. These systems envelop a building from top to bottom, from below grade to the roof.

Nci has openings for full or part-time field inspectors. A great position for a qualified person with a minimum 15 to 20 years experience and works well with the different trade organizations. Construction backgrounds specializing in roofing and waterproofing a must. Background check and references required. Must be bondable. Contact: Lisa Cordero 800.895.5832

G U A R A N T E E S A N D W A R R A N T I E S

There is a high proportion of premature system failures do to financial responsibility for repairing and/or replacing defective roofing or waterproofing systems. This is a major problem for building owners. This financial responsibility can be one or more of the following:

- Manufacturer's Guarantee for generally 10 to 20 years
- Installer's workmanship warrantee for 1, 2 or less frequently 5 years

Disillusionment with the manufacturer's guarantee has virtually wiped out the formerly popular method of negotiating for financial responsibility as building

owners slowly learned, through bitter experience, about the lean protection offered by these misunderstood contracts. For example; typical guarantee terms offered for conventional built-up roof membranes and synthetic single ply roof mats differ in two major respects:

The synthetic single ply manufacturers' guarantees are better than guarantees offer by conventional built-up roofing materials manufacturers. The one distinctive difference is the performance of the synthetic single ply guarantee under ponded water conditions is much more superior than that of the built-up roof membrane guarantees. All materials manufacturer guarantees exclude damage from natural disasters, light-

ning, hurricanes, tornados, vandalism, abuse, negligent maintenance and damage to building components from leaking water. But the biggest issue that may nullify guarantees and warranties is unauthorized repairs by a none certified contractor.

If you know it or not you as building owners pay for the privilege to have a guarantee. In some cases, these fees may appear to be hidden. These fees range from \$25 to \$50/per 100 square for a 10(+) year unlimited liability policy, down to \$5/per 100 square for less than 10 years with limited liability. Read your guarantee and warranty documents when received before final payment is issued.

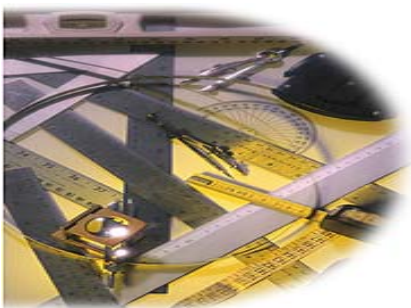
COATING A ROOF

Roof coatings are designed to provide a wide range of benefits. The two top are always protection and building energy conservation. Safety, appearance and performance should be considered when determining what roof coating system to use. Safety is always first, followed by reflectivity performance, and finally, how long will the roof coating last in its particular environment. Notice how price never enters the picture! Be aware that “reflective roof coatings” are different than “aluminum roof paints” and often will not provide the same protection. With white reflective roof coatings, the advantage holds true that “you get what you pay for.”

The proper installation of the roof coating system you choose can make or break a successful roof coating system efficiency and life cycle. There are four key factors that should be closely monitored every time roof coatings are applied.

1. Existing Surface Conditions: the surface shall be clean and free of voids, imperfections, debris, dirt, chemicals and contaminants.
2. Moisture: a dry surface is always important before the application starts.
3. Surface Temperature: Typical application temperature rates of above 50°F and below 90°F are recommended.
4. Application: It is recommended to apply roof coatings in multiple thin applications rather than one heavy coat

There are hundreds of roof coatings to choose from, many having slightly different resins and binders. Understanding the specific product limitations and following the above mentioned guidelines could help eliminate common roof coating issues as we enter the busiest time of the year for coating the roof.



PROJECT PROFILE

Solano County Government Center, Fairfield CA. Solano County officials knew what they wanted for their new government center. According to Darby Hayes, assistant county administrator and project director, the Solano County Government Center was to be designed, constructed and equipped with energy efficient and sustainable design measures, materials, and devices that were feasible, proven and cost-effective. The \$100 million project, which spans three city blocks, includes an administration center that consolidates 15 county departments, a 43,000-square-foot probation building, a five-level parking center, and a public plaza and courtyard. The configuration includes roofing and waterproofing surfaces in a variety of configurations.

“One of the important things for the county was to have a cool roof,” said Kanon Artiche, Solano County architect. “The philosophy of the project was to have an environmentally responsible project that was within budget. We selected products that not only would provide cost savings, but also would provide lasting value. So we needed a roof with long-term performance that would contribute to energy savings.”

Leo Richardson, Johns Manville Taper Design Center, designed the most economical insulation system to provide maximum insulation value and positive drainage. First a one-quarter inch tapered rigid board with half-inch tapered crickets were installed with a half-inch cover board over both concrete and metal decks. Then, three plies of type VI felts with a granulated cap sheet surfacing were installed. The cap sheet was coated with Topgard® 5000 and Topgard® Base coat. This roof system also qualifies toward the TITLE 24-Energy Compliance and is Energy Star rated.

The roof was seven stories high, so it was necessary to hoist materials. A crane was used to fly up the tapered insulation.

“The construction process performed according to schedule and application specifications.

The construction management team asked to roof a portion at a time so other trades could be moved in and out of the area. At the end of each day, all of the plies were applied and sealed to protect the system against elements. The onsite inspector team from Northwest Consulting monitored the work in progress.”

According to Larry Franko Senior Analyst of Northwest Consulting & Inspections Inc., one

of the biggest challenges on the job was to create a positive slope to drain.

Everyone on the team was committed to a watertight roof and took additional measures to ensure the roof’s integrity. For example, large pads designed to accommodate the air-conditioning units were exposed to the elements until the units could be set. Clark Construction built temporary roofs over the air-conditioning curbs to keep the roof watertight. Pitch pockets were eliminated from the roofing system to ensure the roof’s integrity.

“The drainage system was the most important issue because of the size of the roof and the complexity of the inside and outside corners,” Franko with NCI said. “Fortunately Solano County Roofing had a lot of experience with creating slopes in the field and did an outstanding job.”



NCI Positions Available:

Northern California

Part-Time Inspectors needed in Bay Area and Sacramento needs to show previous roofing and waterproofing inspection experience necessary. Great position for retired persons looking to subsidize income.

Bay Area Dealership available Investment Req. Must show skills in communications written and verbal. Construction skills a must.

Southern California

Los Angeles Area Dealerships available Medical Mkt., Educational Sector., Industrial & Commercial Mkt. Investment Req. Must show skills in communications written and verbal. Construction skills a must.

Arizona:

Tucson Area Dealership available Investment Req. Must show knowledge working with Public Agencies.

Contact: Lisa Cordero at (800)895.5832 for a confidential telephone interview.

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For your organizations roofing & waterproofing needs contact a NORTHWEST Consulting & Inspections Dealer in your area Today!

T H E T E E B O X R E V I E W

My last visit to Arizona brought me to the Forty Niner Country Club with a few old friends. This is a small semi-private community golf course, with a rural touch to it. The holes play along residential properties that set well back from the course boundaries and are buffered by stands of trees. It spreads along the wooded riverbed at the eastern edge of Tucson. The Forty Niner's modestly rolling terrain plays to slightly elevated greens that are protected by sand bunkers.

This course is known for its lush, mature landscape and excellent course conditions. It is lined with mesquite, giant cottonwood, eucalyptus and weeping willow trees.

The 15th hole is a long par 5 with a slight dogleg to the left and lined with large trees to both sides. Making a birdie here was just an added bonus to such a beautiful hole.

The course was open in 1961 and as the old duffers say, offers the same

challenges it did more than 35 years ago when the club hosted the PGA Tour's Tucson Open. Don January was the winner in 1963. Locals in the clubhouse boast about Jack Nicklaus failed to make the cut on a Friday because of an 11 he took on the 11th hole! Old Duffy may need some verifications on this one. These Arizonian's pour it on a



little thicker than the Texans after a few of glasses of 18 year old Scottish.

I will say, this course requires accuracy off the tee and excellent course management to score well on it's quick

small greens.

A representative from the brick layers union (which I will not reveal his name at this point in time) had the best score on both the front and back 9.

This course may not be as demanding as some of the modern courses. But, the tree lined fairways and tightly guarded doglegs create the same challenges.

The course is the work of William Francis Bell, one of the more prominent golf course architects of his day.

For more information on this course contact:

Forty Niner Country Club, 12000 E. Tanque Verde Road, Tucson AZ 85749
Phone: 520.749.4212

General Manager: Tim Bishop