FACILITY FACTS

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The Cooling Tower Epidemic
by Michael R. McCormick

Property Management has become an increasingly difficult and technologically challenging business over the last several years. New threats to building integrity develop all the time and "Metal Eating Bacteria" is no exception...

Throughout the Washington metropolitan area, metal-eating bacteria have already infected thousands of area cooling towers and threaten many more. Destructive microorganisms often burrow through the metal and deep into crevices in the bottom and sides of the cooling tower sump. Detection is very difficult, and failure to eliminate this condition can lead to the destruction of a cooling tower by a phenomenon known as Microbiologically Influenced Corrosion (MIC).

In conjunction with MIC, "white rust" is another serious problem nearing epidemic proportions. White rust consists of a thick, waxy coating that leads to rapid deterioration of the galvanizing in a cooling tower and to possible loss of protection within two years, if left unchecked.

MIC and white rust not only eat away at cooling towers, they can devour substantial sums of money in the form of increased electrical costs for system operation due to poor heat transfer and increased maintenance cost. In fact, experts attribute millions of dollars in equipment damage each year to corrosion by microorganism attack, not only to the cooling tower but the complete hydronic system.

Both MIC and white rust are relatively new maladies that have escalated to epidemic proportions locally due to three factors:

1. EPA has banned the use of highly toxic, heavy metal corrosion inhibitors that help mitigate detrimental microorganism growth.
2. Stringent regulations on the use of lead have prompted the reduction of lead content in the galvanizing process, making white rust more common.
3. Environmental regulations have prompted Public Water Authorities to raise the pH levels of local water supplies to reduce the corrosion rate of lead solder joints in water lines, thereby reducing the lead content in domestic drinking water. The increased pH feeds white rust and reduces the effectiveness of biocides that inhibit the spread of MIC.

Additional proactive measures may be taken to retard MIC, but none are 100% guaranteed to prevent the uncontrolled growth of this highly acidic slime. MIC coats the metal surfaces of a cooling tower, preventing corrosion control chemicals from protecting the galvanized metal.

The MIC coating is created by the buildup of waste products from bacteria. The same holds true for white rust, formed when the zinc coating inside water mixes with the water to form a zinc carbonate, which causes rapid deterioration of the metal. Under ideal conditions, the zinc forms a protective coating over the steel interior of a cooling tower.

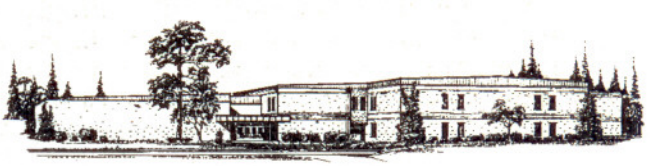
The best mode of protection is an educated owner, property manager, risk manager or building engineer.

Roofing Retrofit... Is Standing Seam Metal Roofing an Option ?
by Chris Hodges

Many building owners are looking for a long range low maintenance option for roof replacements. Standing seam metal roof retrofit seems to offer several advantages over traditional built-up or single-ply tear-off and replace techniques.

For years, the problem has been finding a roof system that will last, with few maintenance worries. With the predominance of flat roofs on most commercial buildings, finding a roof system that meets these requirements has been difficult. Standing seam metal roof recovery systems may be just the system Owners are looking for. Standing seam metal roofing is the fastest growing segment of the commercial and residential roofing market today.

Although many different roofing products have been introduced to (and many driven from) the market over the last 10 years, the underlying problems in roof design and construction remain the same; the roof deck is flat and often has inadequate drainage. We continually expect



Rockledge Elementary School - Woodbridge, Virginia - reroofed with standing seam metal roof system

roofing products to stand up to environmental conditions that they are just not capable of resisting.

Standing seam metal roofs are constructed with slopes of about 1/4 inch in twelve to 12 inches in twelve. The typical design slope for a metal roof is about 1/2 inch in twelve. Simply introducing a positive slope to the roof improves the odds of having a more effective roof system. A properly designed and installed metal roof with a minimum slope of 1/2 inch per foot and minimum 2 inch high seams can easily last from 20 to over 30 years.

Panel fabrication, coating and painting processes over the past years have improved significantly, and the coating life is clearly in the 20 to 30 year range. The choice of color has also improved significantly over the past several years.

One of the factors that makes metal roofing attractive is its use in retrofit applications, application directly over old roofing systems. A light gauge framing system is installed directly over the old roof system and provides a solid substrate for the sloped panels. The effect on a building can often be architecturally pleasing. This type of retrofit eliminates the need for costly roof removal, particularly if the underlying roof contains asbestos, or if removal would cause significant disruption to the facility.

The cost of a metal roof retrofit has become increasingly competitive over the last several years. It is not uncommon to see metal roof retrofit competing at about $6.50 per square foot. When you weigh that cost against high roof removal costs and a thirty year service life, the real cost of a metal roof can be less than other traditional roofs.

As with any roof system, there are some drawbacks and cautions. Like other roofs, metal roofs can leak, and proper design and installation is just as important as with other systems. Ultimately, we are going to see more metal roofing, and as the technology improves and the cost decreases, building Owners will have more choices.

Practical Information About USTs and ASTs

by Paul Swanson & Tom Larson

Many facility managers are faced with problems associated with upgrading or replacing an underground storage tank (UST) system. Federal and state laws are in place regulating UST systems. Until now, systems used for heating oil storage and consumption for non-commercial purposes were exempt. Such is no longer the case in Virginia and Maryland. In Virginia, tanks greater than 5,000 gallons are regulated. In Maryland, heating oil tanks of all sizes are regulated. Any tank suspected of leaking is covered under local and federal regulations.

FEA personnel frequently consult on UST projects. Some of the questions commonly asked are:

➡ *If a UST is not currently used and has no history of leaking, can it be abandoned?*

No. A UST not in use must be closed in the same manner as any other UST.

➡ *If a leak is suspected, what is the proper notification procedure?*

Notification should be made within 2 hours in Maryland and 24 hours in Virginia and D.C. Notification should be given to:

D.C. - UST Branch of DCRA - (202)404-1167
VA - Northern Regional Office of DEQ - (703) 490-8922
MD. - Dept. of Env. - (410) 631-3442

➡ *Can UST's be abandoned in place?*

Yes, however, virtually all jurisdictions regard this as a least attractive alternative, often denied. A site assessment report is still required.

➡ *Can a UST system be replaced with an above ground storage system (AST)?*

Yes, however, ASTs are also regulated. Local jurisdictions do not readily accept AST systems. Normally variances are required from the local fire marshall.

➡ *Is there any reimbursement program for abandonment or replacement of USTs?*

Virginia has a reimbursement program that covers costs of assessment and remediation. D.C. and Maryland have no reimbursement program.

➡ *What are the contamination levels that require remediation ?*

No universal standard has been adopted; however, levels of 100 ppm of total petroleum hydrocarbons (TPH) in soil and 1 ppm TPH in groundwater are the action levels generally accepted by local jurisdictions.

Facility Engineering Associates ***(FEA)*** *specializes in facility problem solving in structures, waterproofing, environmental technology and building system engineering. For more information and help regarding these issues, please call us at* ***(703) 591-4855****.*

Special thanks go to Michael R. McCormick for contributing the article on cooling tower corrosion. Mike is the Director of Engineering Services for the Trammell Crow Company in Washington, DC.