

# TECHNICALLY speaking

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NEW LOOK!  
SAME BORING  
CONTENT.

HOT TOPIX

## COURT CARE

Outside courts such as those for tennis, basketball, track, etc. are used for recreation, competition and sometimes even exercise. In a sense, they provide care for the user and deserve something in return.

Just like everything else, an outdoor recreational court is subjected to wear and tear but more damaging is exposure to the elements. Without proper care and maintenance, water, sunlight, temperature changes and other environmental stresses will quickly deteriorate court surfaces, making them unusable or in extreme cases, unsafe. The entities that maintain recreational facilities have an obligation to keep them in a safe condition and could be exposed to legal action if someone is injured because of a tripping hazard or other unsafe condition.

Recreational courts such as those for basketball and tennis are generally made of asphalt similar to that used in road and parking lot construction and are usually surfaced with an acrylic coating. Properly designed, constructed and maintained, asphalt courts can remain useful for twenty years, or longer, but perfect placement and maintenance is the exception, not the rule. Among the problems we commonly see are cracks, surface unevenness and delaminated, scuffed or worn coatings. Ignored, these can lead to major distress or unsafe conditions.

Major repairs are usually performed by contractors; however, the primary user should start with the following...

**Inspections** - The playing surface should be periodically examined for cracks, blisters or other defects that could permit water to penetrate the asphalt base. Any defects should be mapped and clearly marked for repairs. The net posts should be inspected for stability of the anchorings, rust, and ratchet assembly operation. Anchor instability would be indicated by reflected cracks in the playing surface.

**Coating Repairs** - Minor defects in the acrylic coating should be repaired with similar or compatible materials, to help assure uniformity and proper adhesion. All unstable (broken or poorly adhered) material in the vicinity should be removed and the patch area should be thoroughly cleaned and properly prepared.

**Crack Repairs** - Minor cracks (less than 1/2 inch wide) in the asphalt base can be repaired with flexible pavement caulk. The cracks should be thoroughly cleaned out prior to filling. After the material has cured, it may be necessary to trim it level to the surface of the asphalt. The area of the repair should be recoated in accordance with the previously mentioned coating repair procedures.

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**CARBON  
MAN** WITH  
EXTRA  
FIBER

**EIFS  
AN ACRONYM  
FOR TROUBLE**

a few  
moments with

Dear  
CRABBY

**AVOIDING  
PITFALLS**

**DONTWANNAGOTOREHAB**  
*I Just Say...No...No...No*

# it's the law....

By Mike Williams

In the age of the US Green Building Council, LEED (Leadership in Energy Efficient Design), Energy Star, hybrid cars and escalating energy costs, it is not surprising that the requirement for building energy efficiency is increasing. Building codes will soon require more insulation on your roof.

As a result of higher fuel prices caused by the OPEC oil embargo in the 1970s, the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) developed its first model for energy efficiency in buildings. It was called Standard 90 and building codes around the country soon began to require compliance with the new energy efficiency standards. Although it has been updated multiple times since, the standard has not changed much until now.

Currently, ASHRAE Standard 90.1-2004 is the code requirement for most of the country. It states that low slope (flat) roofs shall have a minimum R-value of 15 and steep sloped roofs with attics will have a minimum R-value of 38. Building codes are the law and the codes state that new construction and reroofing (replacing more than 25% of the roof) must comply with the current code. You simply cannot just reinstall the same amount of insulation as before if the codes have changed during the life of the roof.

ASHRAE has recently approved Standard 90.1-2007 and Standard 189 for Green Buildings. These standards are likely to become part of the codes as soon as the International Building Code (IBC) updates are produced in 2008 and accepted by local code officials. The 90.1-2007 Standard increases the R-value on low slope roofs in the Mid-Atlantic region from R-15 to R-20. Standard 189 seeks to increase building energy efficiency in Green Buildings by 30% over Standard 90.1 (to R-25) and also seeks to improve indoor air quality. The R-value of steep slope roof insulation remains unchanged in these updates.

New and reroofing costs will be impacted by these revisions and you should expect a 2-10% increase if insulation prices remain stable, and possibly much more if producers are slow to respond to the increased demand for insulation.

## COURT CARE

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**Cleaning** - The playing surface should be cleaned frequently. Debris such as stones or twigs could damage the surface and present possible hazards to the players. Leaves present potential slipping hazards and wet leaves can leave tannin stains. Grit (sand, dirt, etc.) present potential slipping hazards and can abrade the surface coating.

**Net Posts** - The net posts should be periodically repainted to protect against rust. Any loose, flaked, or blistered paint and rust should be removed with a wire brush and a rust inhibiting paint should be applied to all non-working surfaces. The working surfaces (pulleys, ratchets, etc.) should be periodically lubricated. Net tension should be released during extended periods of non-use.

**Restrict/Control Use** - Skateboards, bicycles, roller blades, etc. can severely damage the acrylic surfacing.

**Encourage Conscientious and Court-eous Use** - Post guidelines for proper user care (i.e. properly dispose of cans, bottles and other debris, secure gates when leaving, notify management of concerns, problems, etc.).

It's usually beneficial at some point to have your recreational courts evaluated by a qualified professional and it's usually best to do so before major damage is observed. All too often, we're brought in to evaluate courts that are beyond reasonable restoration.

*JIM ROZIER &  
CHRIS UPPERMAN*



# CARBON MAN WITH EXTRA FIBER



Carbon fiber was first introduced to the American building trades around 1996, but its industrial use actually dates back to the late 1800s when Thomas Edison first used carbon filaments in his early light bulbs. They didn't have the tensile strength of today's carbon fibers, but they were decent electrical conductors and heat tolerant. Tungsten proved better and carbon was abandoned in its favor.

Modern commercial and industrial uses include the manufacture of sporting equipment (tennis racquets, golf clubs, hockey sticks, etc.) aerospace (as in production of stealthy and lightweight aircraft), fuel tanks, auto bodies, motorcycle frames, and even musical instruments. Research into more exotic forms of carbon (fullerenes, nanotubes, etc.) will increase their reach into medicine and other scientific endeavors too complex to discuss here.

Carbon fiber reinforced plastic (CFRP) is a fraction of the weight of steel, but is about three times stronger, highly resistant to corrosion and impervious to decay. It was just a matter of time before the building industry started to utilize CFRP technology as an alternative to steel and wood as supplemental reinforcement to existing structures.

Carbon fiber is typically used for shear capacity upgrades, flexural strengthening, and column confinement on existing concrete, masonry and timber structures. Its ability to be installed in congested areas, light weight and flexibility are rapidly making it the preferred method of providing additional strength to existing structures. Additionally, once installed, the reinforcement is maintenance-free.

Applications do not stop there. CFRP can also be used to strengthen buildings around slab cut-outs for stairways and pipe penetrations, restore load capacity to undersized structural elements, as well as offer reinforcement against terrorist attacks (blast hardening). The use of CFRP materials also allows for structures to be upgraded while in use, and can be more economical and durable than traditional reinforcement methods.

Another benefit of CFRP over steel or wood is space. Sheets as thin as 1/8 inch would be equal in strength to conventional reinforcements that would occupy far more room. Consider, for example, a basement wall constructed of concrete blocks (CMUs) that has been overloaded by saturated soils, which has caused the masonry to crack and bulge. The CFRP system can be adhered to the interior wall surface with an epoxy, providing sufficient strength to stabilize the structure and preventing further displacement, with almost no encroachment of the interior space. A traditional steel beam type reinforcement would project into the room by at least six inches or so and installation would entail demolition of the interior floor slabs and ceiling finishes.

CFRP has revolutionized the restoration of historic buildings. The recent trend of adaptive reuse of historic buildings normally includes the need to upgrade the structure to satisfy building codes and

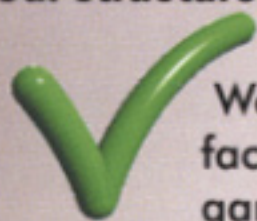
occupancy requirements. As an example, old homes are often converted into office, retail, or museum spaces. This usually means that existing supports must be strengthened to satisfy the Building Code loads associated with the new use, while maintaining historical aspects. CFRP reinforcement is barely noticeable since the material conforms to the shape of the underlying structural element and you probably won't even know it's there once the repair is covered with paint or drywall.

With all that it offers, CFRP reinforcement does have limitations and it should be used only at the direction of a qualified structural engineer. Likewise, only trained, qualified, and experienced contractors should apply this product, regardless of the nature of the project.

*By Chris Carlson and Lorena Michel*

## 5 STRUCTURAL ENGINEERS ON STAFF TO MEET THE CRUMBLING NEEDS OF OUR CLIENTS.

Our structures group totals 8 technical staff to allow us to respond immediately to small emergency projects, as well as, be able to tackle large projects quickly.



We routinely work on building facades of all types, parking garages, carbon fiber strengthening, balcony projects, below grade waterproofing, and retaining wall replacements.



We have recently added new thermal cameras to allow for non-invasive water infiltration surveys on the inside and outside of buildings.



New additions to our structural team: **Robert Radcliff**, an experienced structural rehabilitation specialist and **Lorena Michel**, recent graduate engineer from University of Maryland.

# Liquidated Damages

by Bobby Radcliff

If you have ever used an AIA Agreement Between Owner and Contractor or similar contract for construction projects, there is typically a clause in the Contract that states that "the Contractor and Contractor's surety, if any, shall be liable for and shall pay the Owner the sum of \$\_\_\_\_\_ dollars as liquidated damages for each calendar day of delay until the Work is substantially complete".

## What are liquidated damages?

The term liquidated damages (LDs) refers to a fixed amount agreed upon by both parties entering into a Contract and is considered a reasonable estimate of the actual damages anticipated in the event of a breach or a default of the terms of the Contract. Some examples of a breach in a Contract would be failing to perform certain work items, project duration extending beyond the contract time, etc.

LDs are intended to compensate the injured party (i.e. Owner) for costs (damages) resulting from his inability to use the involved elements (i.e. balconies, garage, plaza,

etc.) for longer than anticipated in the Contract and/or for other costs (such as increased engineering or management

fees) resulting from the Contractor's failure to substantially complete the project in accordance with the Contract terms. Liquidated damages should not be confused with penalty clauses, which are usually not legally enforceable unless there are corresponding rewards for completing a project ahead of schedule. If the established LDs appear to be disproportionate or unreasonably large, they may be construed as penalties and unenforceable.

### How do you calculate LDs?

The amount of the liquidated damages should be commensurate with anticipated actual damages. If a delay of one week means that a commercial parking garage loses income for that period, \$100 per day will not begin to compensate losses that could mount to thousands of dollars per day. Conversely, a delay that prevents the use of a single unit balcony would not warrant damages of \$1,000 per day. Despite contractual agreements, LDs may be modified in court so that they more closely reflect actual damages.

### How do you protect yourself?

In the event that your project is likely to go beyond the Contract schedule, there is typically a clause in the AIA A107 Contract that protects the Owner. Section 14.2.3 states that "The Architect may withhold payment in whole or part, to the extent reasonably necessary to protect the Owner... from loss because of reasonable evidence that the work

will not be completed within the Contract Time and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay."

For example, if the allotted time for a project is ninety percent depleted (notwithstanding excusable delays), but the work is only half done, the Owner is entitled to withhold a portion of the payment from the Contractor for the anticipated damages/loss for going beyond the Contract Time.

## What happens if a Contractor cannot

## compensate the Owner for Liquidated Damages?

If a Contractor is unable to compensate the Owner for LDs, the Owner may pursue the Contractor's surety (i.e. Bonding Company). The primary purpose of a performance bond is to ensure that resources are available in the event that the Contractor violates his contractual obligations, one of which is payment of liquidated damages incurred. This is why it is important to review the risk of your particular project to determine whether or not you require the Contractor to obtain Payment and Performance Bonds. Otherwise, you may not be able to retrieve damages.

Liquidate damages will neither guarantee that a project will be properly completed on time, nor eliminate the headaches and inconvenience that delays may cause. What they can do is help reduce costly legal disputes by establishing up front what the consequences of delays are to be. All involved parties (particularly management, engineering, and legal representatives) should be consulted in determining what damages could be incurred by a delay and how they should be liquidated.

# HOT TOPIC

by Mike Williams

Here are a few facts you should know about dryer vents.

1. The US Consumer Products Safety Commission reports that dryers/dryer vents are responsible for about 15,000 fires every year, killing about 10 and injuring hundreds. Property damage is estimated at nearly \$100 million dollars per year.
2. Dryer/dryer vent fires are more common than chimney fires.
3. Dryers are required, by law, to be ducted to the building's exterior (not to the attic or crawl space). We see hundreds of violations every year.
4. Building codes only allow for a maximum duct length of 25 feet (minus 5' for every 90 degree bend and 2.5' for every 45 degree bend). That's 15-20' in most homes. If you have roof mounted exhaust vents, your dryer better be on the top floor or the duct should be pretty darn straight.
5. Long, winding or leaking ducts reduce air flow and increase lint accumulation.
6. The leading cause of dryer related fires...lint. Lint is extremely combustible; it lights and spreads flames quickly. Lint is sometimes used to make those fire starter logs for your fireplace.

Proper exhausting is critical for clothes dryers to function properly. Clean vents allow for faster drying times, saving time and energy, and will prolong the life of the dryer. Most importantly, a clean vent may prevent a fire in someone's home.

Major manufacturers recommend that dryer vents be cleaned annually and strongly recommend that the ducts be rigid metal pipe, not flexible aluminum or plastic pipe which can catch fire. They also recommend taping the joints, not using screws which can catch the lint.

If you hear someone say that their clothes are taking too long to dry, check to see that the dryer is exhausting to the exterior properly and not obstructed by lint, bird nests or a crushed pipe. You could be averting a disaster.

Homeowners and apartment managers should clean the dryer vents. Fire departments and insurance carriers will love you for it...just ask'em.

EIFS is an acronym for Exterior Insulation and Finish System and as the name implies, it's used as an exterior facing or cladding on buildings. It has been utilized on single family homes, condominiums, commercial and retail buildings, in both new and renovation/retrofit situations for over forty years. Forty years of history notwithstanding, the product has experienced its fair share of problems.

To understand EIFS, it's helpful to know how it's normally assembled. A typical EIFS profile would include (from inside out):

- Structural wall system (CMU, steel stud and gypsum board, plywood, etc.)
- Expanded polystyrene insulation (foam) – either mechanically or adhesively attached to the wall system
- Cementitious base coat material applied over the insulation
- Layer of mesh reinforcement embedded into the base coat material
- Another layer of cementitious base coat material applied over the mesh
- A layer of cementitious finish material that incorporates texture as well as color

Early in its history, EIFS was considered to be a weather barrier unto itself and it was routinely installed without any underlying protection. The fact is the materials (especially early formulations of the cementitious components) could not accommodate the movement that buildings experience. They cracked and allowed water to penetrate. When the installation was on wood-framed structures, the consequences were severe. These problems came to national attention around 1996 when a number of lawsuits were brought against certain manufacturers.

Building code officials from around the country reacted. In some instances EIFS application was disallowed over any material that could be adversely affected by water (such as wood, gypsum board, etc.). In some jurisdictions, EIFS could be installed over wood, but only when it incorporated adequate protection between the system and the substrate. The Industry imposed similar requirements and most manufacturers incorporate "water management" provisions in their application instructions for installation over vulnerable substrates.

A water-managed system typically includes application of a waterproof coating or membrane on the substrate and a drainage path between it and the EIFS. This can be achieved by applying the insulation adhesive with a notched trowel or by using notched/grooved insulation. As with any exterior facing system, proper flashings around windows, doors and other penetrations are necessary, along with weepholes strategically placed to expel water.

One method to deal with movement is to incorporate control joints. They're formed by leaving gaps in the system that are filled with elastomeric sealant and appropriate depth control measures. In order for control joints to work, they must be properly spaced, sized and located.

Attachment issues have also plagued EIFS installations. Initial applications allowed for the insulation to be adhered to structural wall systems, including gypsum (or drywall) boards with dabs of adhesive.

EIFS AN ACRONYM FOR TROUBLE

# a word from the...

# President

My deepest thanks to everyone for your support of our celebration of 25 years in the business. Last year was very rewarding to all of us at ETC and, with your continued support, we look forward to even a better year in 2009.

Hot rubberized asphalt is a very good product that performs well in "green" roofs and protected membrane systems. We all hope that in the near future, the American Society for Testing and Materials (ASTM) will publish a standard that will acknowledge this fine product and establish minimum standards. After an ASTM standard is established, the building codes should then follow suit and acknowledge hot rubberized asphalt as an acceptable roofing material.

If you don't already know, our offices in Columbia moved last year to a larger space. Please come by and visit us there. Chris Carlson has greatly increased his staff to meet the needs of our clients and we've already almost reached our capacity in the new office.

We have some terrific articles for you in this newsletter. I don't want to brag, but from a technical standpoint this may be the best newsletter we've ever published.

We have also been adding people in our Sterling office and in March we moved to a larger facility. Please come by to check out our beautiful new offices.

We have been advocates of energy efficient, "cool" and "green" roofs for over thirty years, but there are some cautions.

1. Not all products labeled "cool" or "green" are all they are cracked up to be. Government investigations are reportedly underway regarding false advertising of some products.
2. Some government and private organizations worldwide warn that it has not been demonstrated that a green roof is really "cost beneficial."
3. Studies are needed to determine the energy required to manufacture, transport, install, maintain, replace, etc. certain "green" products. The concern is that the energy needed makes the product environmentally unfriendly.
4. Useful life projections are often just guesses and cannot be substantiated.
5. Remember the old adage about there being "liars,

**Joe Shuffleton**

## JOE'S TIPS: (ADVICE FROM THE PRESIDENT)

# AVOIDING PITFALLS

Many things can go wrong during a construction or repair contract at a property. However, sometimes the people keeping an eye on the contractor's work can unintentionally create serious legal problems that can cost a good deal of money.

Most contracts clearly provide that the contractor is wholly and solely responsible for supervision of the work and the workers. Unfortunately, sometimes building management staff or other representatives of the building cannot resist the temptation to instruct workers how they should do their job.

Directing a worker how to seal a wall penetration or how to prepare drywall for painting can seem innocent and perhaps even helpful, but once someone starts supervising workers, he or she may become legally and financially responsible for the outcome, lost productivity and even accidents that may occur.

A simple way to help avoid this type of problem is to make sure that all correspondence and discussions of any work is directed to the authorized

supervisor or foreman, not to the individual workers.

Another related problem involves what is known as "means and methods" and this issue is clearly the sole responsibility of the contractor. This is a contract term that basically means that no one can direct the contractor how to do his work. Only the contractor can decide how best to execute the agreed workscope.

So be careful about trying to tell the contractor he needs more people or that the work should be scheduled in a certain manner. Even fairly innocent comments can be interpreted to mean that someone other than the contractor is taking control of work and may eventually be legally responsible for it.

Another related problem is known as "acceleration" of the work. By directing the contractor to move faster than the allowed contract schedule, you can be held responsible for any added costs (added personnel, additional equipment charges, etc.) that the contractor may not have included in his contract price.

Safety is another related issue that

probably is not as clear as it should be. Most contracts make work-related safety the sole responsibility of the contractor. This responsibility is further reinforced if the contractor obtains the permits, holds regular on-site safety sessions, and has a special safety inspector visit the work to check safety procedures.

Unfortunately, all contractors don't do everything they should do to maintain adequate safety provisions and when problems occur, the damaged party (often a worker) may want to file action against everyone involved with the work.

The best advice may be to make sure the contractor acknowledges his sole responsibility for work-related safety and then follows through with instituting safe conditions, procedures, etc. for the workers, residents and the public. Regular progress meetings can help if the contractor is required to report on his safety provisions and confirm that he was the party responsible for instituting safety provisions.

# IDONTWANNAGOTO REHAB

*I Just Say...No...No...No*

Rehabilitation projects are unfailingly inconvenient. They're messy, noisy and unpleasant surprises are the norm. Anything you can do to minimize inconvenience and the unknown is usually well worth the effort and expense. A test installation is one way to help, particularly with respect to window replacement projects.

Much of what's involved in window replacement is concealed by the in-place windows and surrounding exterior facing elements. Removing a window will reveal flashings, internal framing and other items that can affect new installations and the more you know about those conditions, the better able you are to plan for them. For example, if contractors know in advance that the internal framing must be modified to accommodate the replacement, they can provide more accurate estimates. The more that's known in advance, the fewer change orders will be forthcoming and no one but contractors like change orders.

A test installation will also help determine how much damage to interior finishes is likely to occur and how much time may be necessary to complete the project. It's also the best way to assess appearance. What looks good in the product literature may not look so good in place.

Another important aspect of test window installations is in-situ testing for resistance to water penetration. Window performance is rated by the American Architectural Manufacturers Association (AAMA), among others. In theory any window rated as acceptable for installation in Washington, D.C. should perform adequately; however, that may not, in fact, be the case. AAMA has established testing protocols for installed windows and subjecting an example of the product being considered for your project to those tests will help assure that the assembly and

installation procedures will deliver the desired results. It's better to know a window model is unsightly or that it leaks before it's purchased in quantity.

Test installations can be performed either as part of the design process or after a preliminary design has been developed and a qualified contractor has been tentatively selected. Our preference is generally to obtain as much information as possible during design.

Along the lines of test installations are mock-ups which can also help refine rehabilitation projects; however, they may not present as full a picture as needed to make an informed decision. One example would be balcony coatings. A mock-up on a small panel may be a way to help select color, but texture that feels okay on fingertips may be harsh to bare feet.

A test installation will not answer every question, eliminate every surprise or make your rehabilitation project a pleasant experience. Nonetheless, a single problem exposed, bad decision averted or misconception corrected is sufficient to justify the time and expense.

*Kyle Parsons*



**in  
26  
years**

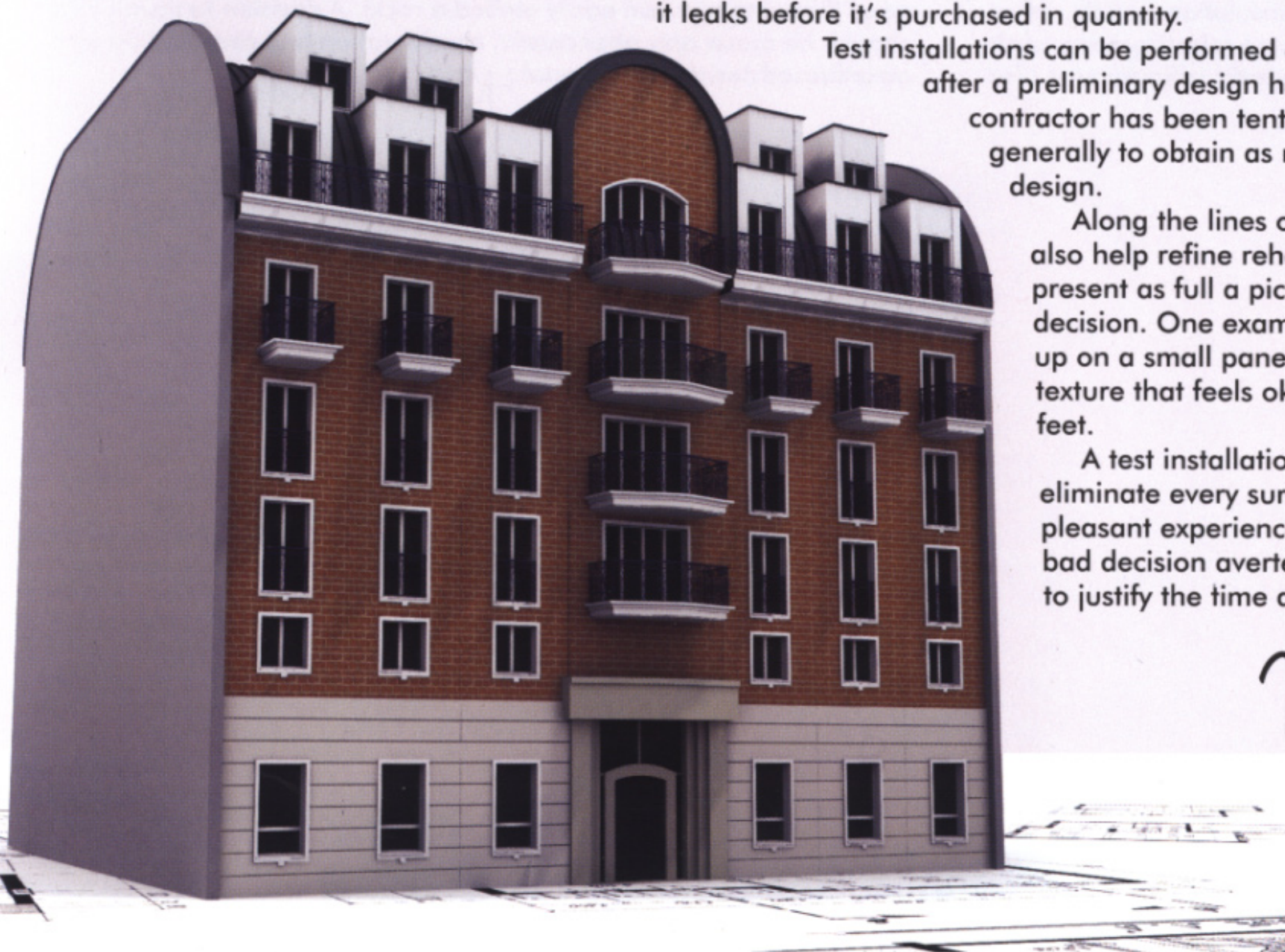
## **Our ETC engineers have:**

- Evaluated over 123 million sq ft of roofing
- Consulted on such famous buildings as The White House, Union Station, Jefferson Memorial and the National Cathedral in Washington, DC and other world capitals
- Traveled from Florida to California and 57 other states to evaluate structures
- Successfully appeared as experts & testified in 14,327.3 lawsuits, hearings, arbitrations and mediations
- Helped save our clients over 16 zillion dollars through reserve and warranty studies
- Walked over 94,362 miles of asphalt & concrete pavement for on site inspections
- Traveled over 6.2 gazillion miles in company vehicle transportation to job sites, proposal visits and unauthorized personal use

*These facts have not yet been verified! -Editor*

# ETC

Virginia 703-450-6220 Maryland 410-740-2233



# DEAR CRABBY

BITE ME



ETC'S CRANKY ADVICE COLUMNIST

Dear Crabby,

There's a persistent odor in a powder room in our condo unit. We live on the second floor of a three-story building and the owners above us occasionally notice an odor in their powder room too. The guy below us is a biker and probably not bothered by weird smells. My husband thinks you're an idiot and won't have a clue about our problem, but you are cheaper than a plumber so, what do you think?

At a loss

## EIFS AN ACRONYM FOR TROUBLE

This proved problematic, particularly when water would penetrate behind the insulation, degrade the substrate (particularly where gypsum wall board was used) and compromise attachment. Those conditions required supplemental attachment (mechanical fastening) or removal and replacement.

As with any building element, proper maintenance is essential to EIFS performance. Sealant joints require periodic replacement and extra care is required in EIFS applications to prevent harm to the thin cementitious coatings and easily damaged insulation panels. What might be acceptable removal procedures in more robust systems (such as masonry) could severely damage EIFS. Periodic refinishing is also

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necessary.

Potential problems notwithstanding, EIFS has its place. Properly designed, installed and maintained, it can function for a reasonably long time and it's relatively inexpensive, at least initially. It can be an effective way to address some shortcomings (aesthetic and functional) with existing systems. It is however, not without limitations. Even when it's properly installed, it's fairly maintenance intensive, it's easily damaged, and it can be an inviting target for vandalism (a kid with a good throwing arm can easily embed a rock). A decision to install EIFS should be made only after careful consideration and consultation with an unbiased design professional.

*Kirk Parsons*

Unfortunately Crabby has recently suffered a difficult MOLT and was able to answer only one question this issue. We look forward to his expanded participation.

Editor



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