



MONTHLY

News and Views from the Connecticut Association of Home Inspectors, Inc.

February 2005

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Meeting Dates

Feb 23 *Well Water Testing & Treatment* - MaryEllen DiLuzio, EnviroTech Labs

Mar 30 *Asbestos* - Steve Dahlem, Department of Public Health

Holiday Inn
201 Washington Ave
North Haven
(203) 239-6700

Defects and Deterioration In Structures

By Dwight Uffer

INTRODUCTION

In any type of building inspection, residential or commercial, it is essential to recognize two underlying categories of existing or impending performance failure within buildings or other structures: Defects and deterioration. A defect, as used here, is the non-conformity of a component with a standard or specified characteristic. Defects may be introduced through poor design, manufacturing, fabrication, or construction before a structure begins its service life and (less frequently) by inappropriate operations and maintenance during its service life. Deterioration, as used in this case, is the gradual adverse loss of desired material properties. Eventual deterioration is normal for most construction materials due to aging and weathering processes and it must be addressed through strategic maintenance, repair or replacement to avoid unwanted stress.

Defects may influence the rate of deterioration or may initiate premature deterioration for materials; hence the two are often involved in a cause and effect relationship. Identifying and understanding defects and deterioration are a critical part of the building inspection process and are critical to your client in extending the service life of the existing structure he/she is about to purchase. Without detection through the building inspection process and subsequent remedies, defects and deterioration may eventually lead to failure of individual components, systems or possibly entire structures.

As part of the building inspection process, determining whether deterioration is natural or premature may help to identify defects within the system. However, deterioration can only be identified as "premature" if the exceptions for normal service life are understood by the inspector. Therefore, we will also discuss *durability*, the relationship between the expected service life of building materials and their actual service life in the absence of uncontrolled defects and deterioration.

THE INSPECTION

A Residential or Commercial Building Inspection of an existing structure may be performed for a number of reasons: Determining if a structure is safe for public occupancy, documenting the condition of existing structures prior to performing restoration, evaluating the condition as part of a "due diligence" survey prior to purchase of a building, determining if a structure is suitable for a change in usage and determining the cause and appropriate remedies of problems that elicit tenant complaints, such as leaks, excessive floor vibrations, trip hazards, etc. In these instances, the purpose of a condition assessment is to identify the frequency and severity of distress, defects and deterioration. If any, identifying the causes of such

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President's Corner

Dwight Uffer

Well January is behind us and we are on the down stretch as far as winter goes. We had to cancel both our Board of Directors meeting in January, as well as the CAHI meeting, due to inclement weather. We do not like to cancel monthly meetings. However, some of our speakers travel long distances to North Haven, as do some of our members, and we have to take the safety of everyone into consideration. If you haven't been informed, we are now using the web site if a cancellation of our monthly meeting is to take place. If you want to know if the monthly meeting has been cancelled, check the CAHI web site on the day of the meeting.

Director Barry Small has been investigating the possibility of getting CAHI members a discount or group rate on E&O insurance. He has sent out a survey with a stamped return address envelope for

your use in returning the survey which I hope everyone sends back. This is for your benefit and if you don't return the survey, he will be handicapped doing his due diligence.

On another note, Bob Dattilo, our VP and web coordinator, has sent everyone via e-mail a message on how to use the CAHI message board and library. If you don't understand how to register, please contact Bob and he will gladly walk you through the system.

On a closing note, I hope everyone is out there marketing their services and also using the CAHI Logo. All of you should use the logo on your brochures, calling cards and any other literature that you pass out. This brings the CAHI name out to the public and makes for a stronger organization.

See you all at the February 23rd. meeting at the Holiday Inn, North Haven CT.

Mark Your Calendars !!!

Due to the Holiday Inn's schedule of having all meeting rooms booked on March 23, 2005, and instead of changing locations...

CAHI's MARCH Meeting will be held at the Holiday Inn on the 5th Wednesday of the month -

March 30, 2005

Due to the snow storm cancellation of our January 26th meeting, we have **rescheduled Steve Dahlem** from the Department of Public Health to speak about all aspects of Asbestos on **March 30th**.

February Keynote Speaker

This month's meeting topic is Well Water Treatment and Testing and will feature MaryEllen DiLuzio from EnviroTech Laboratory as the speaker.

Maryellen has been operating EnviroTech Labs for many years and is a State Certified Lab established in 1974. Maryellen will discuss:

- ✓ Various tests that may be conducted;
- ✓ Sampling methods;
- ✓ Analysis; and
- ✓ Various forms of treatment.

This presentation will also include radon in water.

You will receive 2 hours of continuing education credits.

Connecticut Association of Home Inspectors, Inc. MEMBER SAVINGS PROGRAM

First National Merchant Solutions (FNMS) - Connecticut Association of Home Inspectors, Inc. endorsed credit and debit card processor - is proud to introduce a payment processing program that saves you money. FNMS, a wholly-owned subsidiary of First National Bank of Omaha, is a customer-driven, market-focused payment processor with over 50 years of experience helping merchants process payments in a cost-effective fashion.

Your Connecticut Association of Home Inspectors, Inc. membership entitles you to:

- Reduced VISA and MasterCard discount rates,
- Electronic check conversion with guarantee or verification, and
- Extraordinary customer service.

Save time, improve your bottom line and service to your customers with online tools that let you take control of your business data. With instant access to your account information, FNMS Online provides a window to your company's success that helps save you time and improves your bottom line.

For more information on this program, call First National at **800-354-3988** or visit First National's Web site at www.fnms.com.



REWARD

\$25.00

**FOR ANY ARTICLE
USED IN THE NEWSLETTER**

CAHI will pay members \$25.00 for any article that is submitted and used in the monthly newsletter.

The article must be e-mailed to Rich Kobylenski
rkoblenski023@earthlink.net. Articles should be a PDF
or Word document.

Articles should pertain to our industry. We will review articles
for content and reserve the right to edit, use and/or refuse them.



conditions is usually necessary to recommend proper remedies.

DEFECTS

Defects are introduced most generally during design, manufacture, fabrication or initial construction; therefore they are usually present at the beginning of the service life of the structure. *Latent* defects may be present during original construction and be dormant prior to manifesting themselves at a later period in time.

DESIGN DEFECTS

As more and more builders become designers of the structures that they are building by using the services of commercial software and building designers, it has become apparent that the common practice of peer reviews of architectural and engineering drawings and plans has, in some instances, gone by the wayside. Defects in design are often created by poor detailing, lack of attention to the building's environment, material cost factoring, and lack of attention to the process of construction. Many of these coordination efforts by engineers and architects in the past have short circuited numerous building errors that may have lead to component or structural failures at some time in the future.

Product defects and failures can be attributed to the manufacturer, fabricator and/or designer. It is normally up to the building designer to research and specify the appropriate product considering design life, quality, building environment and cost factors for a particular application. He is assisted in most cases by manufacturer's representatives who work closely with designers and builders to specify the best products to fill the need of the application. As we all have experienced, the world is not a perfect place and, in the manufacturing/fabrication process, defects may be introduced at the factory. While some sources of defects are material dependent from outside sources, others may be due to poor quality control, improper material storage or contaminants introduced in the manufacturing process.

Having performed over 12,000 residential and commercial building inspections during my career as well as being called as an expert witness in numerous cases of product or construction litigation, I have over the years concluded that most cases of building failures and deterioration are caused by the human element. A case in point was one in which a ten (10) year old multi-million dollar home in an exclusive area of homes had well over \$150,000 of window and door deterioration. The home was custom designed by the builder who was well respected in the community and had a track record of constructing quality homes. This builder was large enough that he had his own design group on site

CAH Web Site Info

Message Board

Members are encouraged to create a user account in order to use the message board. Look at the front page of our website for instructions. Fill out all forms completely.

Once you submit the information, YOU WILL NEED TO SEND AN E-MAIL to ctinspect@yahoo.com stating your name and that you have completed your registration.

Please allow 48 hours for verification of your membership.

which specified all materials and was available to make any changes that the prospective owner may want prior to finishing the product.

This home was to be constructed on a high ledge overlooking Long Island Sound and was to face towards the northeast. As the building process progressed, the builder and new owner met with the design group and decided to have as much light exposure as possible along with unobstructed views of the water. The designer specified a top-of-the-line window and door package with vinyl cladding on the exterior of the doors and windows for protection from the elements, as well as to keep maintenance at a minimum.

The home was eventually completed and the new owners took occupancy in the fall of 1993. The first winter for which they lived in the home a winter storm hit and was one of the worst nor'easters that we have experienced in some time. They found that the windows and doors were leaking and water was penetrating the sash. They knew that this was not right and they called in the builder who then called in the designer.

The designer thought that it was a flashing problem so the builder started caulking and replacing flashings, to no avail. Well, as would be the case, the owner of the property was transferred to another part of the country and sold the home to an unsuspecting family from the mid west who loved the views and location of the home.

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These people had lived in the home with leaking windows and doors for about 8 years when they sold the home to a local couple who had us perform a building inspection. My first observation of the home from the curb noted that mildew/fungal growth was evident at the corners of the sash and casings. I inspected every exterior window and door in that home and found that, without exception, the vinyl cladding had deteriorated and the sash was compromised. I reported this to the buyer and they in turn asked to have the windows replaced. The present owner called the builder who in turn put them in touch with the manufacturer of the windows and doors.

When the manufacturer's representative inspected the windows, he immediately advised the owner that these windows were not built to withstand the continuous exposure to the ultra-violet rays and salt spray. The manufacturer, in their literature and engineering data, explained that, if the windows and doors were to be exposed to this environment, they would have to be manufactured with special seals and cladding to withstand the environment. The case went to arbitration and was settled with the builder paying one-third of the cost, and the original owner and present home owner picking up the balance of the cost of replacement. The home owner's building inspector appears to have gotten away with not having to pay anything due to the time that occurred between the initial inspection and time of the claim. This is an example of a *design defect* as well as *deterioration* caused by the defect.

CONSTRUCTION DEFECTS

Construction defects are most likely to be introduced into the project when there is a lack of communication between the various

groups of technical and professional people and the trades. Poor communication between the designers and engineers or trades can lead to numerous problems and concerns. Conflicting drawings and material specifications, as well as interference between structural and non-structural elements, can lead to *latent* building defects which may only be exposed after completion of the project.

Numerous defects can be attributed to miscommunication and lack of coordination between the engineers, architects, general contractor, and the building trades and sub-contractors. Examples: in a concrete slab floor, poor compaction of the soils, lack of /or improperly installed vapor barrier, improper curing of the concrete, or insufficient concrete cover can lead to a multitude of problems with the finished product, including cracking, water or moisture seepage, loose and cracking floor tiles or covering, etc. These defects may or may not surface immediately and can occur months or even years after completion of the project and put a financial burden on the owner of the property at that time.

With proper communication between all the parties of the construction process and a qualified *general contractor* or experienced *clerk of the works*, these problems and concerns can and should be kept to a minimum.

Even with small construction projects similar to constructing a single family residence, the project can go awry if the developer or builder does not have the experience to manage his sub-contractors properly and miscommunication develops.

A clear set of drawings should be given to all parties involved in the construction process, and any changes or modifications noted and initialed on all drawings and specifications.

What may seem like a minor change in a specification can some times result in

catastrophic changes to other components or systems which may evolve into a nightmare for a new homeowner. An experienced builder can identify these potential calamities before they can occur and correct the problem.

The professional building/home inspector should be familiar with reading architectural drawings and examine the documents for any and all changes that have occurred prior to inspecting new construction. Material lists should be consulted to identify the type, grade and spec. of all structural members so that they match what has been installed in the home. The materials list should also specify the type, manufacturer and grade of the windows and doors, and should also be verified. The mechanical components should be specified and also verified as to the type, manufacturer and capacity in order to determine if the product will heat or cool the home adequately. You also have to remember that you have to inspect new construction at least four times during the construction process in order to identify any concerns and relay them to the builder or buyer before the process gets ahead of you. You cannot properly inspect new construction after the home has been completed and the structure is "buttoned" up.

DETERIORATION

In contrast to defects, which are most likely to be present during the early stages of the service life of a structure, deterioration of a system, component or material is both environmental and reliant on time while some types of deterioration may occur prematurely in the service life of a structure, others are a matter of the surrounding environment and aging of the system or component. Deterioration is most likely to occur or be accelerated by the presence of a defect or introduction of a medium such as water or moisture.

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More than half of all deterioration identified in a structure is the result of water or moisture infiltration including interactions. An example of interactions would be "overstress" of masonry or wood members due to exposure to water or moisture. The strength of wood or masonry materials may be affected by the presence of water, thus exacerbating the weakening progression due to loading.

In the weathering process, environmental, biological and chemical attack take place only if the common element "*water or moisture*" is present. Water or moisture induced mechanisms include (but are not limited to) decay, corrosion, freeze/thaw action, soil erosion, settling and upheaval. The harmful presence of water or moisture is not only limited to naturally occurring events, such as rainfall, but can be attributed to infiltration of the elements due to construction defects.

The following are some of the degradation factors that may initiate or accelerate deterioration:

Weathering factors - Deterioration from exposure to water, temperature, wind, radiation, air and airborne contaminants.

Biological factors - Attack of a material by a living organism such as bacteria or insect infestation.

Stress Factors - Loads on a system, either sustained or periodic. Example: Stress may result from gravity loads, thermal loads, shrinkage, swelling or settlement.

Incompatibility factors - Chemical reactions, i.e. chloride attack on steel, connection of dissimilar metals, (electrolysis).

Use Factors - Wear and tear associated with use of the product or structure and application of loads exceeding the initial design load.

CONCLUSION

As we all have had some experience with what we feel are material defects and deterioration in older structures, we must also realize that time takes its toll on both our infrastructure and buildings. As we inspect some of these older buildings and dwellings, it becomes noticeable to us that either the structure has been well maintained over the years and shows little signs of distress or that the structural integrity

may be in question. A well trained and experienced inspector will note that cracks in foundation walls, uneven floors, door jambs at 10° to 20° angles are all potential liabilities and need of further intrusive inspections. However, even minor deficiencies that we note may be the result of defects in material or workmanship from many years before and, before we discount these obvious flaws, we should tend to look further.

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Breyer, Donald. Design of Wood Structures, McGraw Hill, 1993

Nicastro, David, and Surovek, Andrea E. Degradation, Safety, and Reliability of Structures, Part 1

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Tapes

Classic Hydronics Part 1, 2, 3 & 4
 Kids & Hazards
 Moisture Meters
 The Inspector "Heat Exchange Camera"
 Home Inspection
 Inspecting a House Before You Buy
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 Code Check
 Home Inspection Industry Problems
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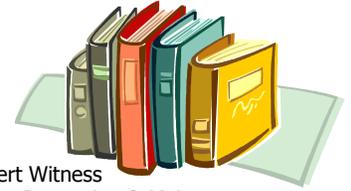


CAHI Library

Any members who have books or tapes to donate
 contact Bob Dattilo at ctinspect@yahoo.com

Books

Timber Frames Post & Beam Construction
 100 Ways to Offer Your Service
 Computer Users Dictionary
 Is Self Employment for You?
 The Business of Home Inspection
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 EPA - Healthy Buildings, Healthy People
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 Mold, Moisture and Your Home
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 The Termite Report
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 Legal Issues for Home Inspectors



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The Licensing Board meetings are held at 9:30 am,
 Department of Consumer Protection, Room 117, 165
 Capitol Avenue, Hartford.

The public is always welcome.

E-mail Bernie Caliendo for the latest meeting schedule at

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