
CONTROLLING CHRONIC MOISTURE AND MICROBIAL PROBLEMS IN BUILDINGS AND HVAC SYSTEMS

This program explains how to avoid or correct dampness, microbiological contamination and structural deterioration in occupied space and interstitial cavities of buildings and within the HVAC system.

Problems can result from design, materials, construction errors, or operating strategies. Also of concern are the Virginia climate, rainfall, building codes and energy efficiency considerations. Attendees will learn how moisture enters and moves through a building and how to prevent the moisture conditions that lead to problems. The presentation links fundamental principles of moisture behavior to practical considerations of design, construction and operation. Attendees will also hear a discussion of HVAC systems including a component-by-component description of both design and materials features that affect moisture and microbial growth within the system.

BUILDINGS

The first part of the day focuses on buildings, starting with basic building science, physical principles of moisture behavior and factors involved in moisture control. Dr. Joe Lstiburek will relate the need to prevent moisture problems from rain to the practical features of drainage planes, claddings, flashings, window installation, weep holes, rain screens and even interior finishes. He will also explain the effects of climate on appropriate rain control strategy. Building and wall cavity pressurization play an important role, and some commonly used designs result in unwanted negative pressure and air flows, including through

interstitial spaces. Dr. Lstiburek also will discuss temperature and humidity problems, the variation of humidity within building spaces, the best (and not-so-good) means used to control temperature and humidity, and how to avoid energy conservation measures that result in mold growth. He will also touch on issues of surface chemistry, physical properties of commonly used building materials, and selection of the right building materials to avoid problems.

HVAC SYSTEMS

Conditions fostering microbial contamination in HVAC systems will be discussed by Paul Ellringer, PE, CIH. He will review basic HVAC system designs and describe key factors for prevention and reasonable goals for microbial control. His presentation will include commonly used energy efficient designs and features such as reheats, dual duct systems and staged cooling coils. His presentation also explains how to prevent dirt and moisture accumulation step by step from the air intakes through filtration, cooling coils, drain pans and downstream ductwork, ending with a discussion of ductwork design and construction. Mr. Ellringer will conclude with a brief discussion of available guidelines and their sources.

ABOUT THE PRESENTERS...

Joseph Lstiburek, PhD, PEng is a principal of Building Science Corporation. He is a forensic engineer who investigates building failures and is internationally recognized as an authority on moisture related building problems and indoor air quality. He has conducted forensic investigations and served as an expert witness on building failures all over the US. He is an expert in the areas of rain penetration, air barriers, vapor barriers, air

quality, durability and construction technology. He is the past chairman of ASTM E241 - Increasing the Durability of Building Assemblies from Moisture Induced Damage.

Dr. Lstiburek is the author of numerous books and technical papers on building science, indoor air quality and durability. These include the US DOE Handbook on Moisture Control and four Builder's Guides: for cold (heating), hot-humid, hot-dry/mixed-dry (cooling) and mixed-humid (heating and cooling) climates. He has also authored numerous technical papers on building construction and he was a special contributor to the EPA/NIOSH guidance document, Building Air Quality: A Guide For Building Owners and Facility Managers. He holds a doctorate in building science from the University of Toronto.

Paul Ellringer, PE, CIH is a principal of Tamarack Environmental, Inc. Tamarack performs IAQ investigations in commercial buildings and specializes in microbial concerns related to HVAC and wall design and construction. The firm also trains building maintenance staff in IAQ management. He has published several articles on engineering modifications for control of fungal contamination in HVAC and microbial contamination related to materials used in building and HVAC.

Prior to forming Tamarack Environmental, Mr. Ellringer worked for many years with the Minnesota Department of Employee Relations, responsible for IAQ concerns in state-owned and state-leased space. In this capacity, he provided both IAQ troubleshooting and training for state employees.
