

Key Note Address

Friday April 21—8:00AM- 8:45AM

May You Live in Interesting Times –

Life as a Consulting Engineer in the 60's and 70's

By Jerry Williams, PE, LEED AP, ASHRAE Life Member

The year was 1968 and the speaker had his first job as a consulting engineer. It was the age of slide rules, rotary dial phones, drafting tables, company letterhead, and the horror of putting together a specification with a typewriter. There were secretaries, ties, the smell of cigarette smoke in the office – particularly in the conference room, and a good whiff of ammonia if you went to the “Print Room” where the diazo drawing prints were being made.

In this presentation, the speaker will take a look at just a few of the things that time, technology, and culture have changed so dramatically in the nearly 50 years that have passed since 1968. In particular, the speaker will take a look at the evolution of the way we make calculations, the way we communicate, the way we learn and mentor young engineers, and the way technology and the explosion of information has changed so much of what we do today as consulting engineers.

But at the same time, some things have not changed all that much. And some might argue that in the area of meaningful interpersonal communication, our adaptation has not kept pace with the advance of technology. The challenges of creating an elegant design today are nearly the same as they were 50 years ago but the pace at which that design needs to come together would be dizzying to that 1968 engineer.

During the presentation, the speaker will explore some of these trends from an historical, poignant and humorous perspective.



Gerald J. (Jerry) Williams, PE, LEED AP, Life Member ASHRAE

Jerry is Vice-President and Principal with 8760 Engineering in St. Louis since its inception in 2009. Prior to this, he spent thirty-four years with McClure Engineering in St. Louis, serving as President from 2000 through 2008. Jerry received his BS and MS Degrees in Mechanical Engineering from Washington University in 1970 and 1972 respectively. He is a Registered Professional Engineer and has authored numerous technical papers on a variety of engineering topics beginning in 1976. He served as an Affiliate Professor of Mechanical Engineering at Washington University from 1973 through 1979. From 1982 through 1992, Jerry served as a principal lecturer for the ASHRAE Professional Development Seminar Series “Air System Design and Retrofit for Energy and Cost Effectiveness”. He served as St. Louis Chapter ASHRAE President in 1995-1996 and has served on the editorial advisory board for HPAC Engineering Magazine since 2003. In 2009, Jerry received the Alumni Achievement Award from the Washington University School of Engineering and Applied Science. Most important to this topic, Jerry has been a consulting engineer in the St. Louis community for his entire career.

Track 1 Session 1

Friday April 21--- 9AM-10AM

The Perfect Wall by Joe Lstiburek Ph.D., P.Eng., ASHRAE Fellow

This shouldn't be that complicated. You don't want the wall to burn, blow away or fall down when the earth shakes. And you need to keep the water out. Keep the air in and the air out. Keep the vapor in and the vapor out. Keep the heat in and the heat out. So you need a water control layer, an air control layer a vapor control layer and a thermal control layer. You add these layers to the structure and make sure stuff does not burn. Done. Except walls are never constructed perfectly. And the order of the layers might matter. Now what? Physics intrudes. The Second Law is a pain and Arrhenius causes grief.

Learning Objectives

1. To gain an understanding of environmental separation
2. To gain an understanding of the Second Law of Thermodynamics and building assembly design and construction
3. To gain an understanding of the Arrhenius Equation and its impact on building durability

Track 1 Session 2

Friday April 21---10:15AM – 11:15AM

The History of Building Construction by Joe Lstiburek Ph.D., P.Eng., ASHRAE Fellow

Actually a limited targeted history of building construction....the evolution of frame walls and the evolution of mass walls. Vitruvius and veneers meet wattle and daub. Wattle and daub meet modern stucco. Seaweed meets fiberglass cavity insulation. Cork meets extruded polystyrene. Now what? Variable permeance layers?

Leaning Objectives

1. To gain an understanding of the historical performance of frame walls
2. To gain an understanding of the historical performance of mass walls
3. To gain insights into future technologies as they relate to wall design and construction

Track 1 Session 3

Friday April 21—1:45PM-2:45PM

Where the Building Meets the Sky by Joe Lstiburek Ph.D., P.Eng., ASHRAE Fellow

Green roofs meet compact roofs and both meet plaza decks. Anyone can design and build a sloping roof with a vented attic. What a concept. Drain the rain and vent moisture away if it gets in. Only seriously deranged people would construct flat roofs that are unvented. Apparently we must all be seriously deranged because compact flat unvented roofs are the norm. And now we are planting things on the top of them? How come this works? Actually, how come this used to work easily but no longer does....

Learning Objectives

1. To gain an understanding of green roof construction.
2. To gain an understanding of compact roofs.
3. To gain an understanding of plaza decks

Track 1 Session 4

Friday April 21—3:00PM-4:00PM

**Building Science and Airflow in Buildings by Joe Lstiburek Ph.D., P.Eng.,
ASHRAE Fellow**

Buildings are complex three-dimensional airflow networks comprised of multi-layer perforated assemblies driven by dynamic air pressure fields where everything is connected to everything else...or maybe not. This is clearly a problem....or maybe not. This clearly can't be modeled....or maybe not. This probably shouldn't be modeled....probably true but maybe not. This can be controlled....or maybe not. This wasn't a problem in the old days...or was it? Problems didn't exist until we were able to measure them....or did they? Why are we measuring what we are measuring and where did all those metrics come from in the first place? How come we depressurize buildings but pressurize plumbing?

Learning Objectives:

1. To gain an understanding of the complexity of airflow in buildings
2. To gain an understanding of the basis of current performance metrics
3. To gain an understanding of the limitations of existing analysis of airflow in buildings



Joseph Lstiburek
Ph.D., P.Eng., ASHRAE Fellow
Principal, Building Science Corporation

Joseph Lstiburek is the founding principal of Building Science Corporation. Dr. Lstiburek's work ranges widely, from providing expert witness testimony to overseeing research and development projects, to writing for the ASHRAE Journal and buildingscience.com. Dr Lstiburek's commitment to advancing the building industry has had a lasting impact on building codes and practices throughout the world, particularly in the areas of air barriers, vapor barriers, and vented and unvented roof assemblies. For example, his work with industry partners through the Department of Energy's Building America program led to significant research into the wetting and drying of walls and ultimately to a major code change relaxing the requirement for vapor barriers in the International Residential Code.

Dr. Lstiburek is also an acclaimed educator who has taught thousands of professionals over the past three decades and written countless papers as well as the best-selling Builder Guides. Fittingly, the Wall Street Journal has described him as the dean of North American building science. He has a joy for telling tall tales to his protégés and audiences.

Dr. Lstiburek holds a Bachelor of Applied Science in Mechanical Engineering, A Master of Engineering in Civil Engineering, and a Doctor of Philosophy (Ph.D.) in Building Science. While still an undergrad, Dr. Lstiburek worked as a residential construction manager; during his Master's degree, he developed the Air Drywall Approach to air barriers. Other formative experiences include working on the Canada-wide Super Energy Efficient Housing R-2000 program and serving as a senior engineer on commercial construction projects for Trow in Toronto. Dr. Lstiburek founded BSC as one of the most influential, innovative, and respected building science firms in North America.

Track 2 Session 3

Friday April 21---1:45-2:45

A History of Smoke Control by Jason Daniels

In one form or another, smoke control has been required by building codes for some time. As codes evolve, so have smoke control requirements and the technology to analyze these systems. This presentation will focus on the evolution of smoke control system requirements in building codes and standards and discuss the tools that have been developed over the last 20+ years to aid in their design.



Jason Daniels, PE, LEED AP

Jason Daniels joined Code Consultants, Inc. in 2007. He has provided fire protection and life safety consultation on many complex projects that include public sector, transit, aviation, high-rise office and residential, cultural, large assembly and sports venue occupancies. He also performs: engineering evaluations of performance-based design alternatives; applies Computational Fluid Dynamics (CFD) analysis to the design of buildings, including smoke control system design, smoke composition and movement analysis, analysis of exterior fire spread, and analysis of exposure conditions created by fire; and performs computer egress analysis of projects. He has a Bachelor of Science in Mechanical Engineering from the University of Missouri-Rolla and a Master of Science in Fire Protection Engineering from Worcester Polytechnic Institute. He is also a registered Fire Protection Engineer in the State of Missouri, as well as a LEED Accredited Professional

Track 2 Session 4

Friday April 21---3:00PM-4:00PM

High-Glide Refrigerant Blends & System Retrofits By John Withouse

Refrigerant choices for refrigeration systems are undergoing significant change. The phase-out of R-22 is well into its final few years. Severely restricted now, production and importation of new R-22 in the U.S of A. will cease as of 2020.

The EPA Significant New Alternatives Policy (SNAP) Rule 20, issued in July 2015, also sets a time line for delisting R-404A, R-507 and others as acceptable alternatives for many commercial refrigeration applications. Some of the first de-listings concerning system retrofits took effect July 20, 2016. The EPA has also approved (or SNAP listed) several alternative HFC and HFO-blend refrigerants that may be used to retrofit existing systems and new systems.

The author will discuss the ramifications of the imposed and pending legislation while exploring the resulting actions that will be required for successful implementation



John Withouse is a mechanical engineer with 20+ years experience in HVACR. He was with Hussmann Corporation for over 15 years, in the role of new product development, focusing on refrigeration, air, and structural systems for supermarket merchandisers, later working with compressors and multiplexed refrigeration systems. John joined Sporlan Division of Parker-Hannifin in Washington, MO in 2008, and is currently a Senior Principal Engineer, serving as a technical lead for refrigerants across the divisions making up Parker's RAC Platform, including Sporlan, Refrigerating Specialties, and RACE in Europe. He graduated from Missouri University of Science and Technology with a Bachelors Degree in Mechanical Engineering and is an ASHRAE Member. He is the author of an article entitled "Hi-Glide Refrigerant Blends" recently published in the ASHRAE Journal.

