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AIVC Airtightness Workshop/Third TightVent Workshop on Building and Ductwork Airtightness,
Design, Implementation, Control and Durability: Feedback from Practice and Perspectives
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Good morning. Thank you for inviting me today to represent ASHRAE. We are pleased to have endorsed this workshop.

I don't have to tell you – building air leakage has always been important as it impacts energy and IAQ, but it has not always recognized as such. Now, as we increase insulation levels and improve HVAC&R equipment efficiencies, it is becoming even more important.

Why do we need good air barriers? Let me share with you some findings from an article published in an ASHRAE Journal article on, Setting Airtightness Standards.

- Code requirements
- Indoor air quality
- Avoidance of building failures
- Energy efficiency
- Building security
- Improved criteria for optimizing the design
- Better construction practices
- Customer satisfaction

Let me start with energy efficiency – ASHRAE and IES added a requirement for air barriers to the 2010 version of Standard 90.1 – our energy standard. Some might say it was long overdue but it is still an important addition.

The change, made via addendum bf, placed performance requirements for air leakage of the opaque envelope. Performance requirements have existed on fenestration and door products for many years. However, evidence suggests that the opaque envelope is the source of the majority of air leakage in buildings, and that the cause is air leakage the lack of attention in the design, construction and enforcement due in large part to the absence of performance criteria.

Uncontrolled air leakage is a bad way to ventilate a building - its unreliable since its driven by weather, its uncontrolled and unfiltered, it enters where the weather tells it so some occupants will not see (or breath) much of that air; it also increases the potential for moisture and other IAQ problems and can damage building materials. We design ventilation systems to bring in

the "right" amount of outdoor air, to condition and filter it, as many of you have known for decades, the mantra is “build tight, ventilate right.”

This is an issue that ASHRAE has handled at its Headquarters. As the renovation of Headquarters in Atlanta started moving into the design phase to achieve a high level of building performance, a lack of envelope airtightness value was identified. This was a gap in the pre-design assessment of the building.

As a result, we conducted an airtightness test in 2007. At that time, airtightness tests were not part of common building practice. Thankfully, that’s changing. Researchers found that although the building was built in 1965, it just met the 2002 U.K. requirements of 10 $m^3/h.m^2$. With some air-sealing work, it could perhaps meet or exceed the 2006 normal practice of 5 $m^3/h.m^2$. It would probably take a lot of effort to reduce enclosure leakage by more than a factor of three to meet the best practice target of 2 $m^3/h.m^2$.

(checking with Mike Vaughn to see if anything done since that time)

To further industry knowledge on this topic, ASHRAE has funded a research project. 1478-RP “Measuring Air-tightness of Mid- and High-Rise Non-Residential Buildings,” which is slated to conclude this spring. I’m going to touch briefly on this. You’ll hear more about this project here at the workshop from principal investigator Wagdy Anis.

The results from this project will enable better design of healthy and energy-efficient mid- and high-rise non-residential buildings. Better understanding of the as-built performance of building envelope materials and designs will help take the guesswork out of the effects of envelope infiltration on system sizing and building design.

This was a recommendation that came from an ASHRAE Presidential Ad Hoc Homeland Security Committee in 2006. While we don’t hear as much about building air security as we did back close to 2001, we all recognize that internal and external air barrier systems are critical components in our defense against airborne chemical and biological agents. The Homeland Security Committee specifically recommended research on test methods for determining building tightness and collection of data on building tightness. The committee was addressing chemical, biological and radiological strategies and information/methods gaps.

Again, thank you for inviting me here today. And thank you for the work you done on behalf of the industry and the public. Tighter buildings are finally being built at an ever increasing rate thanks to the effort of many people in this room. Congratulations are in order.