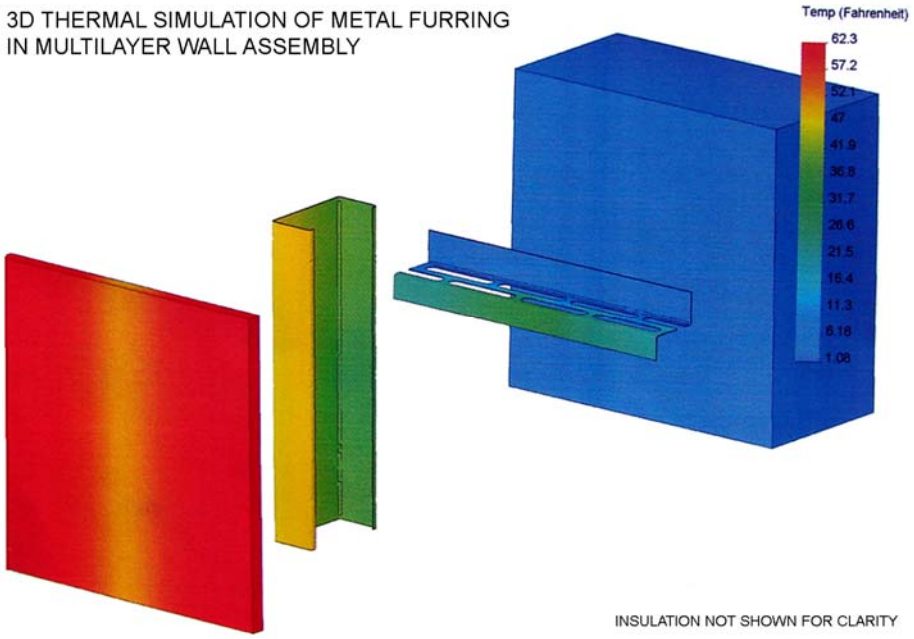
GENERAL DESCRIPTION:

The lectures focus on areas typically overlooked by architects and engineers in process of building envelope design. The topics are chosen on basis of observations derived from both forensic investigations of failed assemblies and peer reviews of architectural documentation.

The lectures are continually developed and updated as the author remains active in the field and adds new stories or replace the old ones in constant pursuit to better clarify the subject. Each lecture is intended as a discussion as opposed to a monologue. Participants are encouraged to ask questions and explore their respective areas of interest even at the risk of a lecture wandering off the main topic.



The lecture titled "**Thermal Engineering in Building Envelope Design**" describes the means and goals of energy engineering with respect to building envelopes: heat transfer and condensation risk assessment procedures and presents the basic thermodynamics concepts with special focus on the areas typically overlooked by architects.

Learning objectives:

1. LEED EA energy optimization credit and ASHRAE 90.1. Comparison between energy optimization and renewable energy source.
2. Basic components of thermal comfort, introduction to psychometrics. How heat is propagated – radiation, conduction, convection.
3. Measures of energy transfer – thermal transmittance, resistance, heat storage, emissivity, and convection.
4. Uniqueness of hot climate and basic condensation risk differences. Moisture transmission and accumulation, permeability of materials and diffusion, air leakage.
5. Condensation risk assessment, three dimensional thermal bridging, steady state and transient analyses, moisture migration analyses.
6. Case study of window in a precast concrete wall,.
7. Case study of a curtain wall bay.
8. Case study of an aluminum transom.