Buildings, Engineering and Standards
An Interview with Werner H. Gumpertz and Thomas A. Schwartz

Engineering firm Simpson Gumpertz & Heger Inc. (SGH) counts on standards in its design, investigation and rehabilitation of structures across the United States and internationally. Werner H. Gumpertz, SGH co-founder, and Thomas A. Schwartz, SGH senior principal, president and head of building technology group, discuss their involvement in ASTM International and how standards impact their practice.

The intersection of design and building — taking a design and translating it into reality — can be challenging. How do standards help negotiate the translation?

WERNER GUMPERTZ: The intersections are not accidental; they are part of the work. You can’t really separate the two. Standards define material constituents and performance expectations; standards define the ways we evaluate building components and systems in the laboratory and in the field; and standards, especially those of ASTM that are updated regularly, help keep design and construction professionals up to date on changes in materials and evaluation methods. Waterproofing in the mid-1980s, we realized that we needed standards for plastic roofing materials that were just becoming popular. Without standards, we could not produce the kind of building materials that we needed. We called on ASTM members and developed the standards. These standards are the basis for plastic roofing materials that we use today. The plastic roofing industry continues to expand in market and reliability, in part, as a result of developing these commonly accepted standards of performance.

THOMAS SCHWARTZ: The process of translating design into reality is one that is fraught with pitfalls for designers, contractors and vendors. The parties often have differing motivations and sometimes seem to speak different languages; there is plenty of opportunity for disagreement.

When I was chairman of ASTM Committee D08 on Roofing and Waterproofing, very often cut off an argument in its inception. The ASTM standards process encourages participation by a diverse cross section of the industry, helping to ensure that the standards are responsive to industry needs and represent a balanced, measured approach to improved practices. The process itself brings credibility to the end product. Having access to competent, credible standards often cuts off the disagreements that would otherwise interfere with the process of implementing design and bringing it to fruition.

For example, during construction of a large building with glazing consisting of double-pane insulating glass units, the owner’s representative noticed that some of the lites of glass showed internal fogging, i.e., visible moisture condensation between the panes of glass. This constitutes failure of the unit. The owner was justifiably concerned that there might be something...
fundamentally wrong with the design and/or construction of his building that was leading to this premature failure and that he would be saddled with the problem of replacing glass in the future. The challenge was that the remaining “unfogged” units needed to be evaluated for a condition that had not yet occurred. Fortunately, ASTM had developed a test method, accepted by designers, contractors and manufacturers, to evaluate the moisture condition within the sealed air space in an insulation glass unit by nondestructive means. The standard, ASTM ES46, Test Method for Frost/Dew Point of Sealed Insulating Glass Units, was used to establish that the remaining units were not progressing toward failure, and the construction could proceed without undue risk.

How are performance standards for building technology used in the marketplace?

THOMAS SCHWARTZ: We use standards to address material performance questions that arise during construction, as discussed above, to improve the predictability and reliability of the materials and processes we use in building, to evaluate products that are new to the marketplace, to evaluate the probable performance of products that have substantial track records but that may be proposed for use in new ways, and to settle questions about the conformance of products to contract requirements.

WERNER GUMPertz: We do a lot of forensic building investigations, and one of the first things we do when we investigate a problem is to determine whether the materials or the methods used in a particular component met the ASTM specifications referenced in the original contract.

Practitioners generally respect ASTM standards because they are produced by volunteers who are knowledgeable in the field. We use standards to help us determine the cause of whatever problem we have been called to investigate. We often find that deviations from such standards help explain the reason for the failure.

SGH has projects located across 50 states and 30 countries. How does SGH manage the challenges inherent in citing and adhering to the many standards and regulations in such a broad base?

THOMAS SCHWARTZ: There are both domestic and international issues.

Domestically, we find that some jurisdictions with code authority tend to modify ASTM standards to “tailor” them to individual states or municipalities. It’s not particularly conducive to the conduct of free trade and consistency of practice because, in the end, performance requirements from state to state and city to city are not very different. Many of the changes to the standards that those entities impose are not as well-conceived and vetted as the standards developed through the consensus process.

This situation leads to difficulty in interpreting the results and in comparing the results of the modified tests to commonly accepted standards. We generally address this by referring to the original ASTM standards and working to help the local authority to understand the differences and their effects. Through this process, we are usually successful in arriving at common ground and moving the project forward.

Globally, we deal with a variety of international standards. The usefulness of ASTM International standards is often apparent, owing again, I suspect, to the transparency and openness of the ASTM standards development process. Then, even if not originally specified, ASTM standards are often brought in to help move the project along.

WERNER GUMPertz: In much of our work, we have to deal with proposals to substitute materials for those specified in the contract. Too often, these proposals, if accepted, would lead to a degradation in the project quality. ASTM standards often give us the ammunition we need to reject unsuitable materials and end further debate.
SGH has had a long involvement with ASTM. Why has the firm emphasized involvement in standards development?

WERNER GUMPERTZ: I developed an interest in roofing when I was a professor at MIT (Massachusetts Institute of Technology), and my department head, Professor Voss, got an assignment to conduct a roofing investigation in New Hampshire. We brought in, for practical purposes, a roofing contractor, and between the professor, the contractor and me, we investigated this roof. The contractor started teaching me a few things, as did Professor Voss, who had a tremendous background in building construction. I soon became very interested in roofing, and that eventually led me to ASTM.

Roofing at the time was purely an art; there was no engineering involved. I thought it would be appropriate to bring in engineering principles. When I became interested in roofing, I called a number of people in the roofing field together for a meeting. When we had our meeting, everybody was talking to me about ASTM, so I joined the D08 committee. There I learned a lot about the way in which roofing materials needed to be analyzed.

I had to learn how ASTM works, and one of the things I had to learn is how to deal with, and overcome, negatives. We had the involvement of the inventor of the Oliensis test, who had been very active in D08 and who kept giving us one objection after another. The maddening thing was that, when it came down to it, he was always right in his objections. Eventually, with the agreement of this member, we passed the first test to analyze field roofing samples.

I became chairman of Subcommittee DO8.20 on Nonstructural Roof Systems (now Roofing Membrane Systems), and then the DO8 committee overall, and my interest and enthusiasm for ASTM hasn’t diminished since then.

SGH supports ASTM by making staff members’ time and participation available for committee work — that is where the productive ASTM development occurs — because, in the long run, it makes our work better and easier in our profession.

THOMAS SCHWARTZ: From day one with SGH (almost 37 years ago), the value of ASTM standards, and, more importantly, the process by which these standards are developed, were instilled in me.

As engineers, our responsibility, first and foremost, is to serve the public. Our clients may pay the bill, but our first responsibility is to the public. The endeavors of ASTM are not unrelated.

Consensus standards such as those developed by ASTM serve the public by improving the reliability, predictability and durability of our infrastructure, by breaking down barriers to free trade and by improving the economy and efficiency of everything we do. Fostering the development of consensus standards allows us to operate more effectively in improving the physical world around us. It’s a natural marriage between our profession and the endeavors of ASTM.

In addition to SGH’s involvement with technical committees that develop standards related to building performance and materials, the firm has interest in forensic engineering standards. How do forensic engineering standards apply to your work? How are ASTM standards relevant in a courtroom situation?

THOMAS SCHWARTZ: All forensic engineering ultimately comes down to establishing credibility for the work that you’ve done. We often rely heavily on ASTM standards to demonstrate the soundness of the approach and the reliability of the results. Standards help us bring clarity to what can be a muddy process.

One particular standard, ASTM E2128, Guide for Evaluating Water Leakage in Building Walls, developed directly from the forensic challenges faced by those who conduct water leakage investigations of buildings. For a variety of reasons, many buildings have leakage problems. Since standard tests for evaluating the water penetration resistance of building components have existed for many years, it has been common for a testing agency or consultant to immediately jump to those types of tests to evaluate the cause of leakage. The problem is that most of these tests were developed to “proof” a building component under very demanding conditions, unlike what a building ordinarily experiences. Over-reliance on these proof tests has led many an investigator to a wrong conclusion and has raised legal challenges to those who have used a more rational and meaningful evaluation.
approach. Professionals and industry representatives in the building design and rehabilitation arena convened in ASTM and developed E2128 to document a thorough, rational approach to conducting building leakage investigations. Since its adoption, this standard has helped substantially in avoiding faulty conclusions in the courtroom and mistakes in assessing and correcting leakage problems in the field.

ASTM is also involved in the development and publication of technical papers that undergo peer review; those are also very helpful in substantiating the legitimacy and credibility of findings. These papers carry weight because they are developed through a critical peer review process.

**WERNER GUMPERTZ: I’ve had a lot of experience in court as an expert witness. When I have referred to the application of ASTM standards, I cannot remember an occasion when anybody challenged the legitimacy of the findings, despite the fact that a court is a very contentious forum. When ASTM standards enter the courtroom discussion they are generally accepted almost automatically.**

**We’ve talked about SGH’s involvement in technical committees and standards; why is SGH so committed to the standards development process?**

**THOMAS SCHWARTZ: We are committed to standards development to improve our collective lot in life. Some of this is altruistic, and some is admittedly self-serving. Standards developed through an open, transparent process generally serve the greater good by reducing waste; improving the safety and durability of our built environment; reducing inefficiencies in design, construction and manufacturing; and improving communication. As to the self-serving aspect of the process, the gathering of professional and industry leaders to participate in the standardization process offers a unique opportunity to learn, debate principles and practices, and expand business networks.**

One of the reasons that we are so committed to the process of ASTM is that we have seen it from all sides. We have compared it to other standards development processes, and we have recognized its advantages.

As to the ASTM process, my recent experiences have given me some perspective. I have served for almost 30 years at the grass-roots level and for the last four years on the ASTM International board of directors. Having had the opportunity now to travel with the board and explore standards development processes with our counterparts internationally, it has given me a heightened respect for what the open ASTM process represents in the world and in the field of fostering free trade and communication among nations.

The ASTM model has served us well. We bring competitors together in the spirit of seeking common ground. They come with disparate special interests. Through the process of debate and rational compromise, we develop something that advances our profession and our industry and allows us to continue to compete at a higher level. There is nothing else quite like it.

**WERNER H. GUMPERTZ** is a co-founder of Simpson Gumpertz & Heger Inc., a national engineering firm that designs, investigates and rehabilitates structures and building enclosures. Gumpertz, an ASTM International member since 1960, has served as chairman of Committee D08 on Roofing and Waterproofing and of Subcommittee D08.20 on Nonstructural Roof Systems (now Roofing Membrane Systems). He is currently a member of Committees C17 on Fiber-Reinforced Cement Products, D08, E06 on Performance of Buildings and E43 on SI Practice. He is a past member and chairman of the Masonry Committee of the Construction Specifications Institute. In 2008, he received the ASTM Carl G. Cash Award, which recognizes outstanding research-oriented contributions to the advancement of building envelope technology. He also received the ASTM Walter C. Voss Award in 1987. Gumpertz has been involved with the advancement of roofing and building technology for many years, and as a consulting engineer he has studied, investigated, analyzed and designed roofing and building technology and its product properties.

**THOMAS A. SCHWARTZ,** P.E., is senior principal, president and head of the Building Technology Group at Simpson Gumpertz & Heger Inc. A registered professional engineer in more than 20 states and the District of Columbia, Schwartz has focused on building envelope systems, including curtain walls, glazing, roofing, waterproofing and masonry. He is an ASTM International fellow and Award of Merit winner; he is also a 2006 ASTM Walter C. Voss Award recipient. Schwartz has been an ASTM International member since 1982 and serves on the ASTM board of directors and Committee E06 on Performance of Buildings. He also chairs E06.55 on Exterior Building Wall Systems. In addition to his ASTM work, Schwartz is a construction industry arbitrator for the American Arbitration Association and a member of the American Society of Civil Engineers and of the Boston Society of Civil Engineers.