# Roofing research revealed

by **Mark S. Graham**

In December 2003, ASTM International's Committee D08 on Roofing and Waterproofing held a technical symposium about roofing research and standards development. The symposium was the fifth in a series dating to the mid-1980s and provided some insight into current research being conducted in the U.S. roofing industry.

The symposium consisted of presentations of 10 research projects conducted by 31 researchers. The sidebar lists the presentation titles. An overview of several presentations follows.

**ASTM symposium presentations**

"Measuring uplift resistance of asphalt shingles"

"Pullout resistance of roofing fasteners using different methods"

"Fire tests on nonmelting plastic roofing/it materials"

"A realistic approach for testing the thermal insulation value of closed-cell spray polyurethane foam roof insulation"

"The effect of reflective roof coatings on the durability of roof systems"

"A comparison of the glass transition temperatures of artificially aged and field-aged roof membranes through the use of dynamic mechanical analysis"

"Effects of application technique and temperature on characteristics of modified bitumen membrane assemblies"

"Durability and cold temperature performance of SBS modified bituminous roofing membranes"

"On the kinetics of thermal loads for accelerated aging"

"Update: service life tests for roofing membranes"

## Topic overview

In "Measuring uplift resistance of asphalt shingles," adhesion (uplift resistance) of asphalt shingles' self-seal strips is tested by three test methods. The research's data show a "double-peel" method of testing provides results between those derived using ASTM D6381, "Standard Test Method for Measurement of Asphalt Shingle Mechanical Uplift Resistance," and a "T-pull" method. The T-pull method represents the case of more rigid shingles that generally exhibit greater uplift resistance.

The research concludes ASTM D6381 significantly may underestimate actual sealant performance. The double-peel method provides results significantly higher than ASTM D6381, ranging from 40 percent to more than 200 percent higher.

In "A realistic approach for testing the thermal insulation value of closed-cell spray polyurethane foam roof insulation," initial and conditioned R-value test data for 1-, 2-, 3- and 4-inch- (25-, 50-, 75- and 100-mm-) thick spray polyurethane foam test samples were collected. The data show thicker samples yield higher conditioned R-values than R-values for similar thicknesses extrapolated from 1-inch (25-mm) test samples, which is standard practice. The research concludes full thickness R-value testing should be considered for inclusion into ASTM C1029, "Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation."

In "Effects of application technique and temperature on characteristics of modified bitumen membrane assemblies," the adhesions of mop-applied modified bitumen membrane sheets assembled using varying application techniques and temperatures are evaluated. Data from this research indicate adhesion of modified bitumen membrane sheets is not increased by raising the application temperature of the mopping bitumen above its equiviscous temperature. In fact, elevated temperatures tend to thin mopping layers, causing the mopping bitumen to cool at a faster rate, which can result in inadequate adhesion and blisters.

"Update: service life tests for roofing membranes" provides an analysis of a laboratory test program intended to predict low-slope membrane roof system performance. The program measures selected physical characteristics of 12 roof membranes before and after heat conditioning and ultraviolet conditioning.

The research preliminarily concludes the EPDM and PVC samples analyzed posted the best ratings using the test program's evaluation technique and built-up roof (BUR) samples posted the lowest ratings. The researchers note that because BUR membranes usually provide excellent field performance, this could mean outstanding performance can be expected from EPDM and PVC membranes.

Symposium proceedings, published as Special Technical Publication (STP) 1451, are available by contacting ASTM at (610) 832-9585 or accessing ASTM's Web site, www.astm.org.

Mark S. Graham is NRCA's associate executive director of technical services.