

Reflective Roofing Tests

- Publication: [FSEC-PF293: Measured Cooling Energy Savings from Reflective Roofing Systems in Florida: Field and Laboratory Research Results](#)



Progress

Previous tests of reflective roof coatings have demonstrated the ability to reduce air conditioning power consumption by an average of 19%. Two homes were selected for participation in our continuing studies this summer. Both were single-family homes with gravel roofs. FSEC was seeking to increase its experience with coating systems over gravel roofs since the insulation in these existing homes was often sub-standard. One was a low-slope, built-up roof over plywood sheathing in Cocoa, FL. Instrumentation and data collection equipment was installed in February 1994 for the evaluation of an Exterior Insulation and Finish System (EIFS) applied to the masonry walls. This residence was an excellent candidate for a reflective roof coating because the roof system changes were isolated since heat gain through the walls had been minimized and electrical end uses were monitored. This home had R-11 attic insulation which was in poor condition. The second home was a flat-roofed structure with a gravel roof and no insulation in Cocoa Beach, FL. Metering began in June of 1995.

The split-summer protocol for these tests was similar to that followed for previous reflective roofing tests. A pre-retrofit period established a base for the monitoring and the roofs were coated in mid-July. Data collection continued through the summer for the post-retrofit period. Analysis of the collected data determined the savings and the reduction in peak demand attributable to the change.

Initial results for peak summer days showed a 25% reduction in cooling use for the uninsulated home and a 17% reduction in the house with R-11.

Related Publications and Projects:

- [FSEC-CR670: Laboratory Testing of the Reflectance Properties of Roofing Materials](#)
- [PVRES house](#)
- [PVRES IR thermography](#)

Our Saviors' School Project

To date, our reflective roof test sites have been single family residential homes or mobile homes. As an extension of earlier



research, a larger non-residential school building was studied to determine the cooling energy savings resulting from a reflective roof surface retrofit.

Our Saviors' was a private school built in the 1960's consisting of grades one through eight, with a student body of approximately 160 and faculty of 15. The building was rectangular with four identical classrooms on the north and south separated by a central hallway. The building was rectangular with the major axis running east-west. Each of the eight identical classrooms had a set of controls for the chilled water cooling system. The 12,000 square feet pitched roof had a gray modified bitumen roll roofing. The building initially contained no insulation and was retrofitted with a drop ceiling and R-19 when an HVAC system was added in 1982. However, the central hallway still had no insulation.

Instrumentation for this site was completed in April 1994. The site includes the standard instrumentation package used on current and past roof coating projects, with some additional sensors to characterize the building's chiller performance. While not in the original data set, these additional sensors became necessary because of a comprehensive repair of the cooling system.

The roof coating was applied after a full year of pre-coating data had been collected. The first coat was applied on May 9th with second and third coats being administered on May 10th and May 30th of 1995. Initial examination of the data suggested substantially lower roof, attic and hallway temperatures. In particular, the roof-attic temperatures evidence significantly improved performance post application. Early indications of energy use before and after the charge usage days with matched weather patterns indicated a 17% reduction in site chiller power. The full report for this project is now available ([FSEC-CR904](#)).

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Building Design Assistance Center (BDAC)
at the
Florida Solar Energy Center

bdac@fsec.ucf.edu