RECOMMENDATIONS

It is believed that in the simplest case, with no bulk air velocity, the heat transfer within the roof air channel will be dominated by natural convection, but that the more likely case, given some appreciable value of bulk air velocity, will be mixed convection heat transfer. Understanding the regime of heat transfer within the air channel is essential to accurate modeling of overall heat transmission through the roof assembly. The AtticSim computer tool was validated against the steep-slope attic assembly with direct-nailed asphalt shingles. The model predicted well the surface temperature of the shingles, the attic air temperature, and the heat flow penetrating the conditioned space. Efforts are continuing to modify the code for predicting the effects of the airflow occurring on the underside of tile and stone-coated metal roofs. Correlations by McAdams (1954) and Brinkworth (2000) and simple boundary layer theory for a constant solar flux are predicting reasonable heat transfer measures within the inclined air channel. The measures of airflow determined from the tracer gas experiments match well the back-calculated values deduced from the correlations provided by McAdams (1954) and Brinkworth (2000) and simple boundary layer theory correlations. We therefore have good representative airflow measures for subtile venting and are in a good position to implement an algorithm fashioned after the work by Brinkworth (2000) for use in AtticSim to predict thermal performance of roofs with underside venting.