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THE ENERGY PERFORMANCE ANALYSIS OF ROOF PONDS*

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The thermal performance of roof ponds has been investigated. A simple but thorough model has been developed; the model consists of water bags laid on a steel roof with the option of flooding the water bags when it is desirable. The roof pond system is regulated with insulation panels in order to obtain the best performance during both cooling and heating modes.

A computer model was developed to perform hourly heat balance analysis of the system. The available empirical equations have been used to obtain the heat transfer coefficients for different surfaces, and the solar insolation has been represented by five different wavelength segments.

A series of calculations based on a constant room temperature has been carried out, and the effect of flooding and insulation control strategies are investigated. This computer model will be incorporated into BLAST and DOE-2 for the energy analysis of the building, where the room temperature can be treated as a variable.

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