

## Abstract

In Thailand, the photovoltaics have been increasingly installed on the roofs of buildings. The primary research found out that the temperature of photovoltaics increases during the day in which reduces the productivity in electricity generation of the photovoltaics. In this study, the photovoltaics roof was designed to eliminate the heat accumulation problem occurring in the gap between the photovoltaics and roof tile.

This research aimed to investigate the development of using photovoltaics as a roof. It focused on preventing the leak when installed on the concrete roof tile. The parametric variables were the amount of water, wind speed, angle of the roofs installed, and types of weather bars. In this research, the size of photovoltaics was 35-centimeter wide and 40-centimeter long with a different number of weather bars: one, two, and three. For one weather bar, the weather bar and photovoltaics was 1.5 centimeter apart. For two weather bars, the second weather bar was one centimeter apart from the first one. For three weather bars, the third weather bar was one centimeter apart from the second one. The wind speed used was the 10-year average in Thailand.

The results revealed that the factors effecting the leakage on the concrete roof tile were ranked as follows: 1) angle of the roof installed 2) amount of water 3) testing time. The number of weather bars had no effect on preventing the leakage of aluminium roof tile. However, using the weather bars together with photovoltaics was able to prevent the leakage if the roof was installed more than 13 degree from the horizontal line with the wind speed of 8.2 meters per second (15.95 knot) and the amount of water of 12.63 liters per minute (421 millimeters per hour).