https://www.manilatimes.net/2024/03/30/news/national/study-cool-paint-coatings-reduce-temperature/1939075

A STUDY from Nanyang Technological University (NTU) in Singapore showed that the use of cool paint coatings helps pedestrians feel up to 1.5 degrees Celsius (C) cooler in urban settings, making the area more comfortable for work and play.

According to the NTU, cool paint coatings contain additives that reflect the sun's heat to reduce surface heat absorption and emission.

These cool paint coatings have been touted as one way to reduce temperatures in cities and mitigate the Urban Heat Island (UHI) effect, a phenomenon in which urban areas experience warmer temperatures than their outlying surroundings.

NTU researchers have conducted a first-of-its-kind real-world study in the tropics to comprehensively evaluate how well cool paint coatings work in reducing city heat.

In a statement provided to The Manila Times, the team coated the roofs, walls and road pavements of an industrial area in Singapore and found that, by comparison with an adjacent uncoated area, the

coated environment was up to 2 C cooler in the afternoon, with pedestrian thermal comfort level, cooling down surroundings by up to 1.5 C.

It was measured using the Universal Thermal Climate Index — a common international standard for human outdoor temperature sensation that takes into account temperature, relative humidity, thermal radiation, and wind speed.

"Our study provides evidence that cool paint coatings reduce heat build-up and contribute to the cooling of the urban environment. This is a minimally intrusive solution for urban cooling that has an immediate effect, compared to other options that often require major urban redevelopment to deploy. Moreover, by reducing the amount of heat absorbed in urban structures, we also reduce heat load in buildings, consequently reducing indoor air-conditioning energy consumption," lead author Dr. Kiran Kumar Donthu said.

Moreover, to carry out their real-world experiments, the NTU researchers selected four rectangular buildings that created two parallel "street canyons" — narrow streets flanked by buildings — in an industrial estate west of Singapore.

One canyon, or "cool canyon," was coated with cool paints on the roofs, walls, and road pavement, while the other (conventional) canyon remained as it was as a "control" for the experiment.

"Findings from the study are not just relevant for cities in Singapore where it is hot all year round, but for other urban areas around the world too. With global warming, people will increasingly look for ways to stay cool. Our study validates how cool paint coatings can be a strategy to reduce the urban heat island effect in the future," lead investigator and associate professor at the NTU School of Mechanical & Aerospace Engineering (MAE), Wan Man Pun, said.

Using environmental sensors, the NTU team monitored the conditions in the two canyons over two months, which included air movement, surface and air temperature, humidity, and radiation, to see how well the cool paint coatings worked in reducing city heat.

The researchers found that during a 24-hour cycle, the cool canyon saw up to a 30 percent reduction in heat released from the built-up surfaces, resulting in the air temperature in the cool canyon being cooler than the conventional canyon by up to 2 C during the hottest time of the day, at around 4 p.m.

Also, the research team found that the air temperature in the cool canyon was lowered because less heat was absorbed by and stored in the building walls, roofs and roads, and which would subsequently have been released to either heat up the surrounding air or the building's interior.

Compared to conventional roofs, the ones with the cool paint coating reflected 50 percent more sunlight and absorbed up to 40 percent less heat as a result, during the hottest time of a sunny day.

It added that the coated walls also prevented most of the heat from entering the industrial buildings.

In future research, the NTU team will focus on how the cool paint coating holds up over time in the same experiment location.