Effect of pavement materials on surface temperatures in tropical environment

ABSTRACT

Loss of natural habitat and increased use of man-made materials have led to higher temperatures in tropical urban landscape. One way to handle this issue is by using paving materials that absorb less amount of heat and provide lower surface temperatures. This paper identifies several pavement materials with low surface temperatures for potential use in a tropical climate. The study was conducted in Putrajaya, Malaysia. Paving materials selected were Blue Impala polished granite (BIPG), Rosa Tanggo polished granite (RTPG), Fontana concrete (FC), and asphalt (AS) based on their popularity of use locally. Surface temperatures of these materials were measured using infrared thermal imaging camera in three different environments namely open space (OS), near water (NW), and under shade (US). The readings were recorded for 28 consecutive days from 6:00 to 24:00. Results indicate that BIPG was 15.5 °C cooler than AS during 12:00ï 15:00 in OS locations. However, BIPG and RTPG surface temperatures increased in NW locations as compared to OS and US locations from 12:00 to 18:00. This study provides information on the use of suitable paving materials to reduce surface temperatures of urban areas in tropical climates.

Keyword: Sustainable city; Urban heat island; Pavement materials; Climate change; Land surface temperature