

Influence of Urban Design on Microclimate in Tropical Historic Urban Canyon: Case Study at Ipoh Old Quarter, Malaysia

Sub-Theme 1: Livable City Making

MeiYee TEOH

School of Architecture, Shibaura Institute of Technology, 3-7-5, Toyosu, Koto-ku, Tokyo, 135-8548,
Japan
e-mail: na18504@shibaura-it.ac.jp

Michihiko SHINOZAKI

School of Architecture, Shibaura Institute of Technology, 3-7-5, Toyosu, Koto-ku, Tokyo, 135-8548,
Japan
e-mail: sinozaki@shibaura-it.ac.jp

Kei SAITO

Faculty of Urban Life Studies, Tokyo City University, 8-9-18 Todoroki, Setagaya-ku, Tokyo, 158-8586,
Japan
e-mail: saitok@tcu.ac.jp

Ismail SAID

Faculty of Built Environment & Surveying, Universiti Teknologi Malaysia, 81310 Skudai, Johor,
Malaysia
e-mail: ismailbinsaid@gmail.com

Abstract

Urban resilience and readiness towards climate change and global warming is becoming an important task in city planning and management today, not only for new urban projects but also for those old quarters existing in majority cities. Outdoor thermal condition, particularly at pedestrian level, have been observed as one of the determinants of urban quality and comfort nowadays. The local climate characteristics, as well as the urban design selection, both affect urban thermal condition. However, the relevant attention on these subjects is so far disappointing, especially in urban revitalization plan. The importance of thermal information for urban design and planning should not be downplayed. Therefore, this paper aims to explore the thermal condition of historical urban canyon at the pedestrian-level, by using a case study focusing at Ipoh old quarter. Ipoh, as a former tin mining town center in Malaysia, has been significantly revitalized in recent years by tourism sector. Especially the old quarter, called Old Town and New Town, has attracted an ever-growing crowd of visitors by its British colonial styled architecture, murals, and cuisines. In order to assess the actual outdoor thermal performance in a more comprehensive way, computational simulation (ENVI-met) and field measurement were carried out in the aspects of air temperature, wind speed and relative humidity. At the same time, at a micro-scale, comparison was also done within Old Town and New Town based on greenery or landscaping available; road geometry, orientation and widths; and building heights. The findings showed that the existence of big trees relatively reduce the surrounding air temperature and increase the relative humidity. The width of roads also plays an influencing role in manipulating the surrounding air temperature and capturing the air humidity. Overall, back-lanes and alleys are more thermally comfortable than the primary and secondary streets for pedestrian movement, and this creates less conflicts with mobile vehicles flows as well. This study thereby suggested that making good use of back-lanes and alleys for pedestrian purpose is an advisable strategy in designing pedestrian route for Ipoh center. For those two-facade shop-houses that most found in Old Town, this finding can reinforce the potential of their back facade to be revitalized for welcoming the walking crowds. For primary and secondary streets, it suggested to plant more trees along the streets to improve the urban microclimate since they are found higher 1-3°C than the average air temperature. Green wall, which has been practiced in the town, is another option for secondary streets due to the limited space available along the

shophouses. In conclusion, improving pedestrian system by considering thermal comfort can encourage pedestrian use, and this will also help to conserve and revitalize the old quarter, making it more lively and sustainable.

Keywords: urban design, urban planning, microclimate, old quarter, pedestrian