

A Study of Urban Morphological Models and Thermal Performance Regarding Volumetric Podium-Pedestrian Complex in High-Density Hong Kong

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Abstract

Hong Kong is an extremely high-density city with skyscrapers soaring to the sky. Facing the lack of land and the high land value, the compact urban form with multi-layered pedestrian system emerged as an appearance of land policies. Podium-pedestrian complex in this study is defined as the cluster of developments which are connected at the podium levels via elevated walkways, on ground passages and underground subways. My research firstly aims at investigating the structure and hierarchy both of the "solid" building spaces and "void" movement spaces in the podium-pedestrian complex in high-density and high-rise Hong Kong. The research will identify what types of spaces can be regarded as basic elements composing the building space, plot pattern, route network and complex structure, as well as study the relationships between these basic elements or types and their position situated in what kinds of hierarchy. The second scope of the study focus on the relationship between the urban morphology of built environment, human perception and behavior of podium-pedestrian complex environments in this high-density context. The most critical issues are that what factors can encourage people to walk and how to make the built environment desirable and friendly to encourage walking and which local microclimatic parameters could be an influential factor on residents' thermal comfort, transport choices and then walking routes choices in indoor, transient and outdoor spaces in the podium-pedestrian complex. Cases will be selected from both urban core and new towns.

Two schools of urban pattern study theories whose research subjects are reciprocally figure and ground in a plan will be applied in the study. One is urban morphology consisting of historico-geographical and process typological approaches, while the other is street and pattern analysis based on configurational and constitutional approaches. Briefly speaking, urban morphology abstracts the compositional hierarchy of urban spaces from the compositional plan layout while street and pattern distills the "structure of urban creation" based on the road configuration and constitutional hierarchy. It seems that the research of urban morphology mainly focuses on the "solid" space on the maps represented by basic urban elements, in contrast to the research of street and pattern majorly concentrated on the "void" street and road spaces for movement and public activities that connect the "solid" spaces. As the two theories and their study approaches can well complement each other, this research will try to identify their comment element

as a key reference point to deconstruct and combine the approaches of two theories and apply it to the Hong Kong podium-pedestrian model recognition.

Moreover, the research will employ and extend an existing thermal comfort models to evaluate the human thermal response to the walking environments of three typical podium-pedestrian complexes in Hong Kong during summer daytime. This study will investigate the dynamic thermal comfort in transient environments and walkways in a “context sensitive” way including assessing urban form, meteorological condition, pedestrian’s perception and activities patterns in podium-pedestrian complexes. This investigation can provide information for creation of comfortable and useful walking environments and promote the planning and establishment of walkable neighborhoods, and thus can reduce the usage of motor vehicles for energy saving, promote physical activities for residents’ mental and physical health, revitalized neighborhoods for land values increase.

It is estimated that two findings will come out. Firstly, an urban morphological parameters matrix will be developed to assess and classify the volumetric features of nominated podium-pedestrian complexes into several types. Secondly, a mapping of transient thermal perception of the citizens for each morphological type of podium-pedestrian complex will be conducted based on field measurements and survey. This study will guide and evaluate the urban design schemes of the comprehensive elevated walkways with volumetric podium developments. Ultimately, the study can support and provide a guideline to the practitioners and planners to make changes of urban design strategies towards walking-friendly and walking comfort.

