

ventilation and daylighting. The existing intermediate terraced house unit with deep planning design is not effective for passive strategies. Larger openings (higher WFR) are needed to allow sufficient natural ventilation and air movement to avoid symptoms such as chest tightness and lethargy. However, proper shading of the openings is necessary to allow sufficient daylight while eliminating solar heat gain.

CONCLUSION

The study concludes that there is significant positive linear relationship between indoor environments and occupants' health. The current by-law requirement of 5% window-to-floor ratio for natural ventilation is inadequate for occupants' comfort and health, thus further review is needed. Proper consideration of natural ventilation and daylighting design strategies in terraced house is essential as it determines how the occupants can manage the indoor environment to achieve comfortable and healthy living environment.

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REFERENCES

- Agung, N. M. and Mohd Hamdan, A. (2006) The development of solar chimney geometry for stack ventilation in Malaysia's single storey terraced house. *Architecture & Environment*, 5(2), October, pp. 77-96.
- Bluyssen, P. M. (2010) Towards new methods and ways to create healthy and comfortable buildings. *Building and Environment*, 45, pp. 808-818.
- Bluyssen, P. M., Aries, M., Dommelen, P. V. (2011) Comfort of workers in office buildings: The European HOPE project. *Building and Environment*, 46, pp. 280-288.
- Choi, J.-H., Beltran, L. O., Kim, H. -S. (2012) Impacts of indoor daylight environments on patient average length of stay (ALOS) in a healthcare facility. *Building and Environment*, 50, pp. 65-75.
- Hashim, A. H., & Rahim, Z. A. (2008) The Influence of Privacy Regulation on Urban Malay Families Living in Terrace Housing. *International Journal of Architectural Research*, 2(2), pp. 94-102.
- Kubota, T., Toe, D. H. C. and Ahmad, S. (2009) The effects of night ventilation technique on indoor thermal environment for residential buildings in hot-humid climate of Malaysia. *Energy and Buildings*, 41, pp. 829-839.
- Lembaga Penyelidikan Undang-undang (2013) Building (Federal Territory of Kuala Lumpur) By-laws 1985. Petaling Jaya, Malaysia: International Law Book Services, ISBN 9789678923255.
- Lim, Y. W. (2013) Indoor Environmental Comfort in Malaysian Urban Housing. *American Journal of Environmental Science*. 9(5), 431-438.
- Lim, Y. W., Mohd Zin, K., Mohd Hamdan, A., Ossen, D. R. and Aminatuzuhariah, M. A. (2012) Building Façade Design for Daylighting Quality in Typical Government Office Building. *Building and Environment*. 57, pp. 194-204.
- Loewenstein GF, Weber EU, Hsee CHK, Welch N. (2001) 'Risk as feelings'. *Psychologic Bull* 2001;127:267-86.
- Malaysia Department of Statistic (2000) General Report of the Population and Housing Census, Department of Statistics Malaysia.
- Omar, E. O., Endut, E. and Saruwono, M. (2010) Adapting by altering: spatial modifications of terraced houses in the klang valley area. *Asian Journal of Environment-Behaviour Studies*, 1(3), pp. 1-10.
- Sadafi, N., Salleh, E., Haw, L. C. and Jaafar, Z. (2011) Evaluating thermal effects of internal courtyard in a tropical terrace house by computational simulation. *Energy and Building*, 43, pp. 887-893.
- Todorovic, M. S. and Kim, J. T. (2012) Buildings energy sustainability and health research via interdisciplinarity and harmony. *Energy and Buildings*, 47, pp. 12-18.
- Zakaria, R. (2007) Sustainable housing for residential-industrial neighbourhoods in Malaysia – a study on the elements of indoor environmental quality improvement. Doctor of Philosophy, Faculty of Built Environmental and Engineering, Queensland University of Technology.