The effect of external lighting conditions on pedestrian flows in London

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Background

The nighttime appearance of major cities across the world is changing as existing street lighting is replaced. The question of whether this could affect pedestrian movement is asked. Comfortable environments are accessible, promoting activity and therefore health. It is important to know whether external illumination conditions can influence pedestrian movement patterns because this information can be used to inform lighting design in an urban area.

Method

Pedestrian movement flow is recorded by counting pedestrians passing through twelve “gates” at five locations in London. The data is the number of pedestrians entering points passing through each gate was recorded during five minute intervals. The surveys were completed either side of the clock change in Autumn 2016, so that different lighting conditions at the same time of day could be compared.

Gates were sampled on the basis of relative illumination conditions and whether they provide direct or indirect routes to a destination. The lighting conditions were compared individually between sites and after the clock change and between pairs of sites with a variation in lighting conditions.

Summary of Findings

In general, there were lower footfalls in the period of darkness (i.e. 12 pm clock change). The percentage changes were largest around Russell Square.

(1) Individual sites before and after the clock change.

On eight of twelve sites there was an increase in footfall after the clock change for the total time period of counts (t1 and t2) and three of four remaining sites had a total footfall percentage decrease of more than 10% after the clock change. There were also the quietest routes with overall footfalls of no more than 111 per hour. Footfalls on the other routes ranged from 111 to 235 per hour.

So if twelve routes for the percentage decrease in footfalls after the clock change was greater in (i) compared to (ii) showing the possible influence of the change of end of civil twilight time. This means that relative illumination conditions may be influenced by decrease in illumination conditions. On these nine of the twelve routes, the percentage change was positive higher footfalls after the clock change (i) and negative lower footfalls after the clock change (ii) in three locations this could demonstrate a change in route taking behaviour, or that people change their commute (leave work earlier) after the clock change.

(2) Pairs of sites with a variation in lighting conditions.

On closer examination of the ratio of people taking the darker (ii) to indirect lighter route in (i) and (ii) there is need for a relation increase in people taking the indirect lighter routes (ii) after the clock change in 4 of 6 sites (p**).

*The three routes on which this was not the case were: all sites of Russell Square.

**Russell square garden, Drummond Street, Marylebone Lane and Western Avenue and Portal Way in North Acton.

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Acknowledgements

Current students studying for MSc Light & Lighting collected all the data presented in this research in the course MSc BES113.

Peter Reppenhagen for his advice.

This work is funded by EPSRC grant 75552: Do external lighting conditions affect pedestrian environment? The epistemological study UCL Future Leaders in Engineering and Physical Sciences, Pump-priming and feasibility studies.