Abstract

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Modelling the Impact of Fused Grid Network Design on Mode Choice Behaviour.

Introduction The fused grid (FG) is an alternative model developed by the Canada Mortgage and Housing Corporation to combine the easy orientation and connectivity of the traditional grid pattern with the land use efficiency and quietness of the contemporary cul-de-sac pattern. One of the main distinguishing principles of the FG design relative to contemporary neighbourhood patterns are the FG's higher non-motorized network connectivity versus vehicle network connectivity. This paper reports on research related to the influence of FG design principles on non-motorized use for home-to-work commuting and home-to-shopping trips. Methods This study uses a macroscopic-level approach to investigate the impact of FG on mode choice behaviour through hypothetically retrofitting an existing neighbourhood in Kelowna, BC, using the FG design principles. First, the change in travel distance and time due to retrofitting the neighbourhood was estimated using ArcGIS. Then, the modal shift in home-to-work and home-to-shopping trips due to the change in travel distance and time was estimated using multinomial logit mode choice models that were developed using the 2013 Okanagan household travel survey. Results The results suggest that the influence of travel time on choosing the auto mode is much stronger and more significant for home-to-work trips compared to home-to-shopping trips. The results also show that retrofitting the road network resulted in reducing auto modal share by 13 percent and increasing non-motorized modes by 64 percent for home-to-work trips. However, an insignificant shift in modal share towards non-motorized modes for home-to-shopping trips was found. Conclusions In conclusion, this study demonstrated the effectiveness of the FG principles in reducing auto use and increasing non-motorized modes use for home-to-work trips. In addition, the study revealed that infrastructure investments related to providing more accessibility for non-motorized users might have more impact on decreasing auto use compared to restricting vehicular network connectivity.