# บทความที่น่าสนใจประจำเดือนมีนาคม 2559

## สาขาวิทยาศาสตร์และเทคโนโลยี

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| 1 | Title: | Demand Profiling for Dynamic Traffic Assignment by Integrating Departure Time Choice and Trip Distribution |
| | Author: | Michael W. Levin, Stephen D. Boyles, Jennifer Duthie and C. Matthew Pool |
| | Journal: | Computer-Aided Civil and Infrastructure Engineering, February 2016, Volume 31, Issue 2, Pages 86–99 |
| | Abstract: | One challenge in dynamic traffic assignment (DTA) modeling is estimating the finely disaggregated trip matrix required by such models. In previous work, an exogenous time distribution profile for trip departure rates is applied uniformly across all origin-destination (O-D) pairs. This article develops an endogenous departure time choice model based on an arrival time penalty function incorporated into trip distribution, which results in distinct demand profiles by O-D pair. This yields a simultaneous departure time and trip choice making use of the time-varying travel times in DTA. The required input is arrival time preferences, which can be disaggregated by O-D pair and may be easier to collect through surveys than the demand profile. This model is integrated into the four-step planning process with feedback, creating an extension of previous frameworks which aggregate over time. Empirical results from a network representing Austin, Texas indicate variation in departure time choice appropriate to the arrival time penalties and travel times. Our model also appears to converge faster to a dynamic trip table prediction than a time-aggregated coupling of DTA and planning, potentially reducing the substantial computation time of combined planning models that solve DTA as a subproblem of a feedback process. |
| | Database: | Wiley Online Library |

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| 2 | Title: | A Clustering Algorithm for Bi-Criteria Stop Location Design with Elastic Demand |
| | Author: | Taha Hossein Rashidi, David Rey, Sisi Jian and Travis Waller |
| | Journal: | Computer-Aided Civil and Infrastructure Engineering, February 2016, Volume 31, Issue 2, Pages 117–131 |
| | Abstract: | This article proposes a bi-criteria formulation to find the optimal location of light rapid transit stations in a network where demand is elastic and budget is constrained. Our model is composed of two competing objective functions seeking to maximize the total ridership and minimize the total budget allocated. In this research, demand is formulated using the random utility maximization method with variables including access time and travel time. The transit station location problem of this study is formulated using mixed integer programming and we propose a heuristic solution algorithm to solve large-scale instances which is inspired by the problem context. The elastic demand is integrated with the optimization problem in an innovative way which facilitates the solution process. The performance |

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| | | of our model is evaluated on two test problems and we carry out its implementation on a real-world instance. Due to the special shape of the Pareto front function, significant practical policy implications, in particular budget allocation, are discussed to emphasize the fact that the trade-off between cost and benefit may result in large investments with little outcomes and vice versa. |
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| 3 | Title: | Solving Detour-Based Fuel Stations Location Problems |
| | Author: | Ali Zockaie, Hedayat Z. Aashtiani, Mehrnaz Ghamami and Yu (Marco) Nie |
| | Journal: | Computer-Aided Civil and Infrastructure Engineering, February 2016, Volume 31, Issue 2, Pages 132–144 |
| | Abstract: | This article studies the problem of locating fuel stations to minimize the extra cost spent in refueling detours, which belongs to a class of discretionary service facility location problems. Unlike many studies of similar problems in the literature, the proposed model considers capacity constraints and compares different ways to incorporate them in the formulation. Note that ignoring the capacity constraint results in nonoptimal and unrealistic solutions. The proposed models are solved using both an off-the-shelf solver (CPLEX) and a specialized meta-heuristic method (Simulated Annealing) developed in this study. The solution methods are tested and compared in two case studies; a test benchmark network and a large-scale network. An effort to overcome the memory limitation of CPLEX through more compact formulation was partially successful: it results in a model that is less tightly bounded by its linear relaxation and hence is much more difficult to solve. In contrast, the Simulated Annealing algorithm scales better and is able to consistently yield high-quality solutions with a reasonable amount of computation time. |
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| 4 | Title: | Advanced air distribution: improving health and comfort while reducing energy use |
| | Author: | A. K. Melikov |
| | Journal: | Indoor Air, February 2016, Volume 26, Issue 1, Pages 112–124 |
| | Abstract: | Indoor environment affects the health, comfort, and performance of building occupants. The energy used for heating, cooling, ventilating, and air conditioning of buildings is substantial. Ventilation based on total volume air distribution in spaces is not always an efficient way to provide high-quality indoor environments at the same time as low-energy consumption. Advanced air distribution, designed to supply clean air where, when, and as much as needed, makes it possible to efficiently achieve thermal comfort, control exposure to contaminants, provide high-quality air for breathing and minimizing the risk of airborne cross-infection while reducing energy use. This study justifies the need for improving the present air distribution design in occupied spaces, and in general the need for a paradigm shift |

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| | | from the design of collective environments to the design of individually controlled environments. The focus is on advanced air distribution in spaces, its guiding principles and its advantages and disadvantages. Examples of advanced air distribution solutions in spaces for different use, such as offices, hospital rooms, vehicle compartments, are presented. The potential of advanced air distribution, and individually controlled macro-environment in general, for achieving shared values, that is, improved health, comfort, and performance, energy saving, reduction of healthcare costs and improved well-being is demonstrated. Performance criteria are defined and further research in the field is outlined. |
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| 5 | Title: | Thermal comfort in air-conditioned buildings in hot and humid climates – why are we not getting it right? |
| | Author: | S. C. Sekhar |
| | Journal: | Indoor Air, February 2016, Volume 26, Issue 1, Pages 138–152 |
| | Abstract: | While there are plenty of anecdotal experiences of overcooled buildings in summer, evidence from field studies suggests that there is indeed an issue of overcooling in tropical buildings. The findings suggest that overcooled buildings are not a consequence of occupant preference but more like an outcome of the HVAC system design and operation. Occupants' adaptation in overcooled indoor environments through additional clothing cannot be regarded as an effective mitigating strategy for cold thermal discomfort. In the last two decades or so, several field studies and field environmental chamber studies in the tropics provided evidence for occupants' preference for a warmer temperature with adaptation methods such as elevated air speeds. It is important to bear in mind that indoor humidity levels are not compromised as they could have an impact on the inhaled air condition that could eventually affect perceived air quality. This review article has attempted to track significant developments in our understanding of the thermal comfort issues in air-conditioned office and educational buildings in hot and humid climates in the last 25 years, primarily on occupant preference for thermal comfort in such climates. The issue of overcooled buildings, by design intent or otherwise, is discussed in some detail. Finally, the article has explored some viable adaptive thermal comfort options that show considerable promise for not only improving thermal comfort in tropical buildings but are also energy efficient and could be seen as sustainable solutions. |
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| 6 | Title: | Roles of the human occupant in indoor chemistry |
| | Author: | C. J. Weschler |
| | Journal: | Indoor Air, February 2016, Volume 26, Issue 1, Pages 6–24 |

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| Abstract: | Over the last decade, influences of the human occupant on indoor chemistry have been investigated in environments ranging from simulated aircraft cabins to actual classrooms. We have learned that ozone reacts rapidly with constituents of skin surface lipids on exposed skin, hair, and clothing, substantially reducing indoor ozone concentrations but increasing airborne levels of mono- and bifunctional compounds that contain carbonyl, carboxyl, or α-hydroxy ketone groups. Moreover, occupants transfer skin oils to and shed skin flakes (desquamation) onto indoor surfaces. Evidence for the presence of skin flakes/oils has been found in airborne particles, settled dust, and wipes of indoor surfaces. These occupant residues are also anticipated to scavenge ozone and produce byproducts. Under typical conditions, occupancy is anticipated to decrease the net level of oxidants in indoor air. When occupants scavenge ozone, the level of SOA derived from ozone/terpene chemistry decreases; the fraction of SVOCs in the gas-phase increases, and the fraction associated with airborne particles decreases. Occupants also remove organic compounds, including certain chemically active species, via bodily intake. Studies reviewed in this paper demonstrate the pronounced influences of humans on chemistry within the spaces they inhabit and the consequences of these influences on their subsequent chemical exposures. |
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| 7 | Title: | Hybrid cooling clothing to improve thermal comfort of office workers in a hot indoor environment |
| | Author: | Wenfang Song, Faming Wang, Fanru Wei |
| | Journal: | Building and Environment, Volume 100, 1 May 2016, Pages 92–101 |
| | Abstract: | The study aimed to examine the effect of a hybrid personal cooling garment (PCG) on improvement of thermal comfort of office workers in a hot indoor environment. Eleven male subjects underwent two 90-min trials with one in PCG (i.e., with the hybrid personal cooling garment) and another with no cooling (i.e., CON). The trials were performed in a climate chamber with an air temperature of 34.0 ± 0.5 °C, relative humidity of 65 ± 5% and an air velocity of 0.15 ± 0.05 m/s. It was found that the hybrid PCG could remarkably improve the whole-body thermal sensations (TSs), skin wetness sensations (WSs) and comfort sensations (CSs) during most of time of the trials compared with CON (i.e., from the 10th min to the 40th min and from the 70th min to the 80th min for TSs, from the 10th min and the 20th min to the end of the test for WSs and CSs, respectively) ($p < 0.05$). The upper-body and lower-body TSs, WSs and CSs were all significantly improved in PCG from the 10th min to the end of the test ($p < 0.05$). In addition, mean skin temperatures and the total sweat production were also significantly reduced in PCG ($p < 0.05$). In summary, the hybrid PCG was highly anticipated to improve thermal comfort of office workers while doing office work in the studied hot and moderate humid indoor environment. |
| | Database: | ScienceDirect |

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| 8 | Title: | An integrated outdoor spaces design procedure to relieve heat stress in hot and humid regions |
| | Author: | Shing-Ru Yang, Tzu-Ping Lin |
| | Journal: | Building and Environment, Volume 99, April 2016, Pages 149–160 |
| | Abstract: | Traditional settlements may suffer from extreme thermal stress owing to the types of buildings and the activities of local people. In this study, thermal environmental measurements were made 12 times in one year, and an ENVI-met model was used to simulate and examine the outdoor thermal environment in Tainan, Taiwan. The results reveal that when the model is applied to hot and humid regions, the shortwave reduction method can be utilized to estimate mean radiant temperatures values more accurately. Various simulated scenarios indicated that planting trees is the most effective means of reducing the physiologically equivalent temperature (PET) - by up to 15.2 °C. Integrated scenarios for outdoor spaces design are proposed and can reduce the frequency of heat stress from 79.7% to 40.5% compared with the original condition. Based on the measurements, model verification, and analysis of adjustment strategies, an integrated outdoor spaces design approach for relieving heat stress is proposed to promote thermal comfort, the practicability of the design procedure, and the aesthetics of the environment. The proposed integrated procedure can help planners and architects to selecting strategies for designing outdoor spaces to relieve heat stress with the ultimate goal of improving outdoor living environments. |
| | Database: | ScienceDirect |

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| 9 | Title: | Effect of gypsum type on properties of cementitious materials containing high range water reducing admixture |
| | Author: | Ali Mardani-Aghabaglou, Onur Can Boyacı, Hojjat Hosseinnezhad, Burak Felekoğlu, Kambiz Ramyar |
| | Journal: | Cement and Concrete Composites, Volume 68, April 2016, Pages 15–26 |
| | Abstract: | In this study, the effect of cement gypsum type on properties of the properties of cement paste, mortar and concrete mixtures containing high range water reducing admixture (HRWR) was investigated. Two different types of cement prepared from the same clinker but containing either calcium sulfate hemihydrate or dihydrate as retarder were used. The fresh and hardened (compressive strength and drying-shrinkage) properties as well as static and dynamic rheological behavior of the mixtures were investigated. Compared to the mixtures containing dihydtate, the fresh and rheological properties of mixtures were negatively affected when cement-containing hemihydrate was used. However, hemihydrate utilization had a positive influence on the early compressive strength. The adverse effects on fresh properties were more significant in paste mixtures. These negative effects decreased in the mortar and concrete mixtures. The presence of hemihydrate in cement was found to increase the drying-shrinkage. |
| | Database: | ScienceDirect |

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| Title: | Materials characteristics affecting CO2 curing of concrete blocks containing recycled aggregates |
| Author: | Bao Jian Zhan, Chi Sun Poon, Cai Jun Shi |
| Journal: | Cement and Concrete Composites, Volume 67, March 2016, Pages 50–59 |
| Abstract: | In order to enhance the CO2 curing efficiency of concrete block prepared with recycled aggregates, several material characteristics of the concrete block including moisture content, bulk density, aggregate to cement ratio, recycled aggregate content and types of binders, were studied experimentally to assess their effects on the CO2 curing process. The results indicated that, during 2 h of CO2 curing period, the moisture content and aggregate to cement ratio of the prepared blocks had significant effects on the CO2 curing degree and the compressive strength. Appropriate pre-drying of the block specimens before CO2 curing enabled the maximum curing degree, and the compressive strength attained was comparable or superior to that of the 6 h steam cured blocks. The bulk density and recycled aggregate content of the prepared blocks would also influence the CO2 curing degree, but their effects on compressive strength were more complex. It was confirmed that the presence of recycled aggregate in the concrete blocks can promote the CO2 curing efficiency. |
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