Book Review:

Michael A.P. Taylor (ed.)
Transportation and Traffic Theory in the 21st Century[1]

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This book presents the Proceedings of the 15th International Symposium on Transportation and Traffic Theory (ISTTT), held at the University of South Australia in July 2002. The ISTTT is one of the most important gatherings for transportation and traffic theoreticians. Its main purpose is to share advances in the scientific aspects of transportation and traffic phenomena. A renowned International Committee and the plurality of excellent contributors, makes this book a valuable tool for the scientific and professional world in the transportation and traffic arena.

However, unfortunately the book is not well structured in different areas or chapters to help the reader in his search for specific topics of interest. The order of papers presented has no meaning at least in a first approach to the book, and subjects are mixed nearly stochastically. Another problem is the lack of uniformity and standards in the format of papers. For example, neither the references nor the headings (or other elements of the papers) have a common pattern. But notwithstanding these formal weaknesses, the book is interesting and strong in its content.

Ceder opens the book with a paper on step functions for improving transit operations. The paper reaches its goals of looking in depth at the possibility of variable trips schedule within given tolerances, and the use of deficit function for additional elements in the transit operations planning process. The second paper, by Wang et al, is an improvement on previous

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research done by two of the authors. The sensitivity – based algorithm for modelling urban taxi services is more efficient than the quasi – Newtonian algorithm previously proposed. The third paper on transit network reliability:, by Bell et al, is rather synthetic and the goals are not clearly explained at the start; also, it is difficult to assess at the conclusions if the goals were achieved.

The paper on minimizing conflicts between rail operations and maintenance of infrastructure, by Luk and Ferreira is an interesting contribution to real problems, and its findings may be useful to the railways industry. A second paper on this line, by Wiransinghe et al, discusses optimal terminus locations for rail lines and presents a railway-planning tool that could be important to transport planners and decision makers.

The research about queue discharge flow models for signalized intersections, reported by Akcelick and Bersley will be, with high probability, seminal for future work in this area. It is a very interesting paper both for academics and practitioners, and a great contribution to this area. A posthumous paper by the sadly missed late Professor Newell of UC Berkeley on over saturated isolated intersections, and a paper on development and implementation of adaptative strategies for traffic signal networks, by Gartner, are two relevant efforts in the traffic signal optimization area. Finally in this line, Brilon and Wu present a new method for analyzing unsignalized intersections. This is a robust paper that may prove of interest for seasoned practitioners.

The paper on supply chain networks by Dong et al, is a valuable mathematical contribution to the subject. In the same applied logistic area, Raicu and Taylor present a paper on computarised decision support systems for managing the transportation of sugar; this work falls into the formal trap of giving analytical developments in the middle of the conclusions. Otherwise the paper is good and well supported.

The only paper on pedestrians deals with pedestrian behaviour theory and models. Hoogendoorn and Bovy: present an important contribution to understand the rationality of pedestrians flow behaviour.

There are two papers on safety problems that give new insight in this area. The first, by Davis, searches for a unified approach to causal analysis in traffic safety using structural models. The second, by Nowakowska, attempts to identify similarities and dissimilarities among road accident patterns.

The research on a model to estimate the environmental impact of road transport, presented by. Alessandrini and Lemessi, is the only paper directly concerned with the environment, and provides a comprehensive approach to estimate the impacts from macro to (the so called) ultra-micro-models.

There are also two papers on ITS; the first by Yin et al deals with modelling risk-taking behavior in queuing networks. The second, by Tamiguchi et al, considers dynamic vehicle routing and scheduling with real time information. Both papers contribute with interesting developments to the promising area of ITS.

Heydecker presents a highly interesting paper on the complex topic of dynamic equilibrium network design. It is worth reading carefully and has great interest for specialists of the area. Rosa and Maher discuss algorithms for solving Probit path-based stochastic user equilibrium traffic assignment problems, in a robust paper that goes in depth into the problem.

Two papers on macroscopic traffic models by Giorgi et al, and by Kerner, represent interesting contributions to the area. It is a pity and almost of bad taste, that Kerner just presents a large list of references of his own papers.

A relevant contribution to the understanding of moving bottlenecks is the paper by Muñoz and Daganzo. Here it is particularly worthy of mention the clarity and simplicity of the authors to explain the various subjects touched upon .

On the merging process in highways, there are three important papers to consider. The first by Troutbeck, on the performance of uncontrolled merges using limited priority processes, the second by Sarvi et al, on modelling freeway ramp merging processes during congestion, and the third, by Kita et al, on a game theoretic analysis of merging – give way interactions.

Yang et al present a paper on determining optimal toll levels and location of congestion pricing schemes. Unfortunately, it is not easy to understand and the conclusions are just a summary of the paper. This problem is shared by the paper on travel time reliability in degradable transport networks, by Lo. A more interesting paper in this sense, by Lam and Bell, deals with optimal road tolls and parking charges for balancing the demand and supply of transport facilities. This paper also presents clear goals and conclusions.

Representing the typical attitude of isolation of some researchers, that only give references to their own cultural environment, the paper by Poschinger et al, on concurrent macroscopic and microscopic traffic flow models is, nevertheless, a paper worth to read and study. Zhang and Lin attain the state of the art with their paper on developments in continuum traffic flow theory It is a pity, though, that there are no critical comments about the developments summarized and the extensive references list is not well cited in the text.

Another theoretical contribution on ITS, ATCS and ATIS is the paper by Hoogendoorn et al on short-term predictions of flow conditions in a multilane multiclass network, while the paper on freeway traffic oscillations by Mauch and Cassidy, is a good contribution to this area of traffic flow theory.

The last two papers of the book are fairly dissimilar. The first by Heidemann is a theoretical effort dealing with the mathematical analysis of non-stationary queues. The second, by Lebacque considers an extension of the Lighthill-Witham–Richards (LWR) traffic macroscopic model. As many other papers of the book, it looks to develop and to find more possibilities for using the LWR model, but it is a robust effort worthy of taking into account.

Summarizing, the book is worth reading in general. The formal weaknesses, perhaps produced by a large number of referees impossible to manage, looses relevance when compared to the contents. The bias contents (i.e. a significantly larger number of macroscopic and highway flow theory papers), is probably a design problem ultimately due to the composition of the International Advisory Committee. Notwithstanding, it is probably impossible to have a Symposium on *all* the subjects and areas of Transportation and Traffic Theory. This book is good enough in its contents. The editor should be proud of having gathered such an impressive list of sound and profound papers, and prospective buyers should be happy of having the opportunity to read the book.