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Book Review

Concise Theory of Road Safety by T.P. Hutchinson

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Title	:	**Concise Theory of Road Safety**
Author	:	**T. P. Hutchinson**
Language	:	English
Pages	:	144
Year	:	2020
Publisher	:	First published on the web at RoadSafetyTheory.com/CTRS on 11 March 2020

According to World Health Organization, the number of road traffic deaths is constantly increasing, hitting 1.35 million in 2016.[1] Thus, road safety is included in Sustainable Development Goals as a part of the urban development agenda and the public health agenda.[2] This book broadens discussions about road safety, from its empirical data to its theory. The author shows that road safety is not merely a data-based subject, but also theory is needed. Hence, the author of this book elaborates more precisely what the theory means in road safety and the benefits of using theory in analyzing road accidents.

There are (three) central arguments or theories discussed in this book that relate to road accidents. They are the impact of road accidents based on the speed and human hits. Also, the last second before the impact which related to the aspects influencing impact speed. The last argument regarding the generalization from a test to the real world.

The first theory regarding the last second or before the vehicles crash are discussed in chapter 5 and 6 in this book. The author introduces types of models used to describe a driver's reaction or an autonomous system when they confront an obstacle. There are 2 (two) types of models this book discusses, the first is Model [A], and the second one is the suggested model to be built up. Model [A] is explained by the author as a simplistic model that focuses on delayed constant acceleration, particularly braking systems.

[1] World Health Organization. (2018). *Global Status Report on Road Safety 2018*: Summary.

[2] Wegman, F. (2017). "The future of road safety: A worldwide perspective". *IATSS Research*, 40(2): 66-71

However, the model [A] might not work precisely as the people expected in reality. Thus, the author suggests another model be built. In his previous work,[3] Hutchinson has proposed a model that reacts to emergencies according to 3 elements: desired output, transition rules, and the number of states of the vehicles. To ease the readers to understand types of models, the author has provided examples of those types of models at the end of chapters.

The second theory regarding the impacts of road accidents discussed in chapter 9 and 10 in this book. The book acknowledges that the common death of pedestrians in road accidents is due to head injury, which occurs primarily due to the collision of vehicles. Thus, this is highly intriguing how the book relates the pedestrian head injury to the car's design, especially on the bonnet. This book argues that the stiffness of the bonnets could protect pedestrians' heads from damage. However, for lower and higher speeds, the stiffness will be insufficient. Besides that, the author comes up with the measurement for injury, namely proxy for injury. This measurement spotlights the acceleration and deformation of humans. The author recognizes this measurement might not fit in all circumstances. Thus, the idea of adding bio-fidelity is highly compelling. Other measures discussed in this book are Head Injury Criterion (HIC) and maximum acceleration. These are thought to represent the severity of the injury and the likelihood of mortality.

The last theory concerning the generalization from a test to the real world is discussed in chapter 11. This chapter elaborates on how beneficial theory is to measure and obtain data regarding road accidents. This chapter shows the method to figure out the level of safety in real-world impact scenarios. This method measures the acceleration pulse and the main focus here is the injury. Hence, the author suggests four calculations in this method: measuring the acceleration pulse, generalizing the test, corresponding cost, and average cost. This method is used to test the vehicle and the impact on the pedestrian in particular circumstances.

What makes this book refreshing is this book highlights how important the impacts of velocity change and how the car's design could protect pedestrians from a head injury. Also, this book manages to compile different angles of road safety theory uniquely. By bringing together a broad range of topics, this book not only engages with the cause and result of road accidents but also addresses critical issues on statistical hypothesis testing, randomized trials, intervention (behavior or attitudes of the drivers), model of interaction of two variables and the cost-effectiveness in road accidents.

Regarding the extensive debates and topics, this book is quite accessible. The author has successfully drawn the readers' attention by the way the authors discuss the topic in this book as the author tells the story of his experiences. The language used in this book is understandable and enjoyable to read. Thus, this book brings advantages to non-road safety specialists or academics and other people interested in accessing the book in meaningful ways.

[3] Hutchinson, T.P. (2016). “A method of constructing models of reaction to an imminent road crash”. *Traffic Engineering and Control*, 57(3): 97-103

This book is well-organized and structured. Before going to the main chapter, this book has provided information and introduction related to the main chapter in another chapter before. For instance, the first main argument explained in chapter 5 and 6 regarding the detection of, reaction to, emergencies. In the previous chapter (chapter 2-4), this book has provided some background information on how important the empirical data used in this book, also an analysis of the typical road accidents and the reasons behind it. These chapters ease the readers to follow the statement and arguments in this book. Furthermore, as the author has stated, he expected that the readers of this book would be enjoyable for people outside the road safety researchers. However, it might be difficult for people outside the field to understand. Hence, the use of mathematical symbols and notation, even algebra can be found almost in every chapter in this book. Nevertheless, this book is undoubtedly enjoyable for road safety researchers and people interested in road accidents.

Greater attention could also be devoted to road accidents cases in developing countries. It would be an exciting chapter to compare how road accidents occur in other countries with different backgrounds. Thus, it would add more varied data, which could broaden and add uniqueness to this book.

To sum up, Concise Theory of Road Safety is an essential and remarkable book that is also enjoyable to read. The author T.P. Hutchinson has done a fabulous job of bringing many aspects of road safety theory into this book. It is exhaustive but concise as the name of the book. This book would be absolutely beneficial for the field of road safety and another area such as law. This book surely could be guidance and consideration for the legislative in order to create or modify the road safety regulations both for the vehicles and the drivers.

Conflict of Interest: The author declares no conflict of interest.

References

Hutchinson, T.P. (2016). "A method of constructing models of reaction to an imminent road crash". *Traffic Engineering and Control*, 57(3): 97-103.

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