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A system approach to ensuring cycling safety in New Zealand

H. W. Mackie[*], G.H. Hawley[*], A Woodward[#] and E. Claridge[†]

[*]Mackie Research Ltd
2 Princes St, Auckland 1010, New Zealand
email: hamish@mackieresearch.co.nz

[#]University of Auckland
Auckland, New Zealand
email: a.woodward@auckland.ac.nz

[†]NZ Transport Agency
Wellington, New Zealand
email: Elizabeth.Claridge@nzta.govt.nz

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1 INTRODUCTION

In 2014, the NZ Cycle Safety Panel was established to examine the risks and causes of cycle crashes in New Zealand and a suite of actions to improve cyclist safety was recommended [1]. During this process, the need to better understand crash causation was recognised as a significant gap. In particular, it was suggested that broader system factors distal to immediate crash situations (such as a lack of strategic and fiscal emphasis on cycling or inconsistent design practices) need to be considered in addition to more obvious situational factors. Although a 'safety in numbers' effect may reduce the cycling crash rate over time, we can still expect an increase in the absolute number of cycling casualties, with increased participation, unless very proactive steps are taken to understand and address the cycling safety system. A range of potentially useful accident causation methods (Stanton et al 2013) that might be applicable to road safety and cycling casualties have emerged over time and, although not always specific to the road safety domain, road safety applications are emerging (Salmon, Cornelissen & Trotter, 2012; Salmon & Lenne, 2015; Stevens, Salmon & Patorniti, 2015; Toft, Dell, Klockner & Hutton, 2012).

This research builds on contemporary accident analysis methods to develop a qualitative Cycle Safety System (CSS) model and then, using a mixed methods approach, identify causal pathways to provide evidence for cycle safety interventions.

2 METHOD

A 'control structure' for how the CSS currently works (for better or worse) was developed, following the AcciMaps method (Svedung & Rasmussen, 2002), which is based on Rasmussen's model of risk management (Rasmussen 1997). Utilising the broad categories of Road users, Environmental Context, Practices and Standards, Government Policy and Societal culture and values. Actors (people/organisations) as well as 'non-person factors' were then identified within each category and the influences and feedback loops between them were identified. The draft model was developed by the researchers then tested iteratively by ten stakeholders with links to cycling safety and three further workshops with key stakeholders. Crash investigation reports and coroners reports were then used to identify immediate causal factors in 30 actual fatal cycle/vehicle crashes, along with focus groups with cycling safety stakeholders (20 people in three focus groups) to identify the more indirect but

influencial factors related to practises and standards, government policy and societal culture and values. The overall goal is to produce a theory based and well-tested model for cycle casualty causation and a range of typical causal pathways that can form the basis for Safe System interventions to prevent a future escalation in cycling trauma.

3 RESULTS

The draft CSS control structure diagram is presented in Figure 1 below.

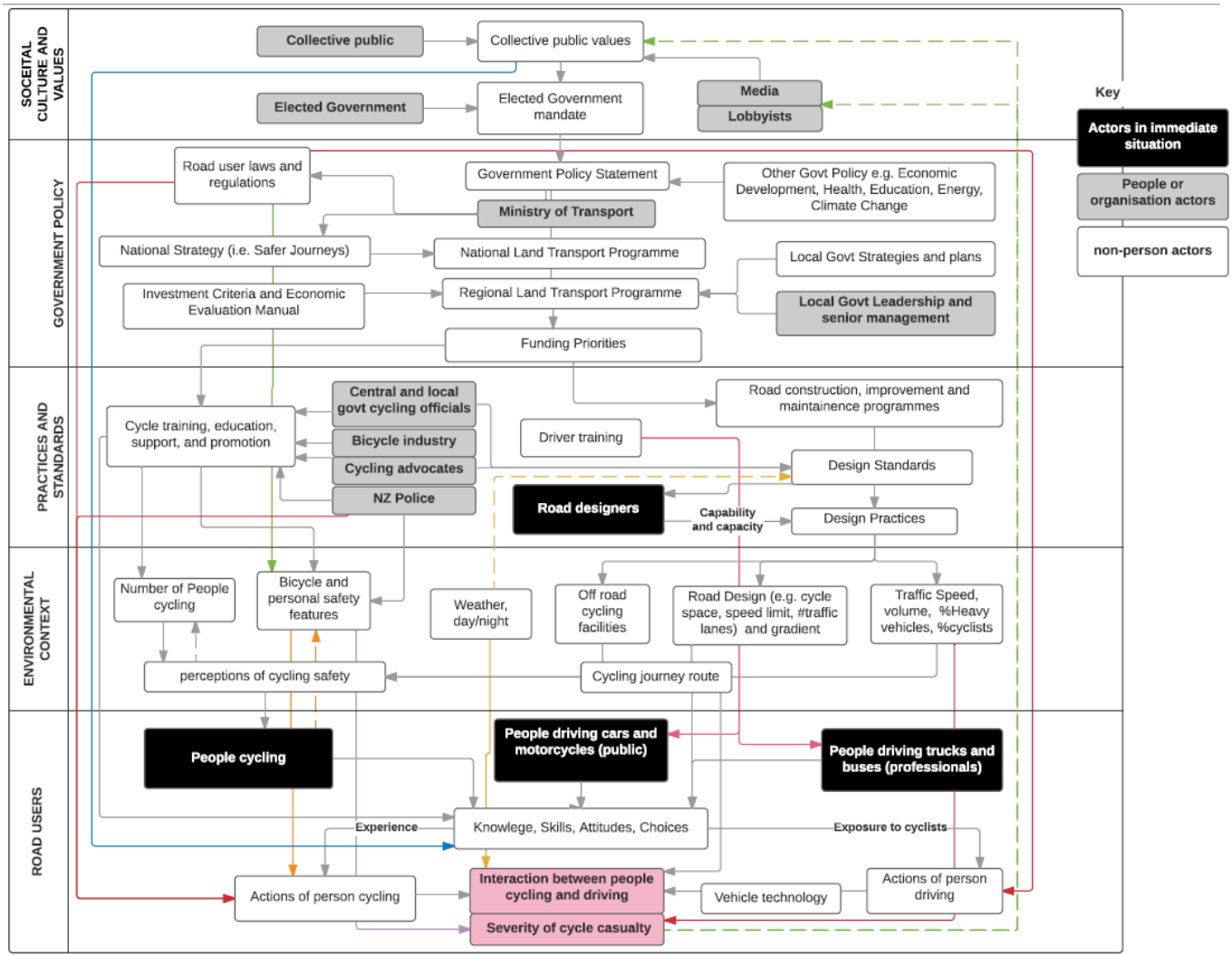

Figure 1. Control Structure diagram for New Zealand's Cycling Safety System

Application of the model to real cycling crashes identified a number of 'system failures'. Accordingly, examples of areas of the cycling safety system where more effort is needed to protect cyclists include:

- a clearer story about the benefits of cycling in New Zealand's future mobility system. This would help to activate political buy-in and investment for improved cycling conditions.
- better integration of cycling requirements into speed management initiatives
- identifiable, safe and user-friendly rural cycling routes
- designing infrastructure and training to address cyclist speed
- more involvement by the cycling industry in cycling safety
- a range of initiatives to address cycling/heavy vehicle interactions
- well understood 'standard operating procedures' for motorists and cyclists within an improved cycling skills training system
- addressing road infrastructure that affords unsafe road user behaviour and cycling crashes in the way it is designed.

4 DISCUSSION AND CONCLUSION

Since the completion of this work, one area of deeper enquiry is the design standards and actions of design engineers in the provision of safe and user-friendly infrastructure for cycling. Workshops are currently being carried out to determine barriers in planning systems that prevent good practice cycling infrastructure from being delivered. In New Zealand, as in many 'new world' countries, the greatest challenges appear to be in planning and design processes, as opposed to technical knowledge.

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