

https://dspace.org/

Systemic factors in the investigation of South African railway occurrences

Hutchings, Jessica

2017

https://hdl.handle.net/10539/23846

Hutchings, Jessica (2017) Systemic factors in the investigation of South African railway occurrences, University of the Witwatersrand, Johannesburg, <https://hdl.handle.net/10539/23846>

Downloaded from a DSpace repository. https://dspace.org/

ABSTRACT

The principle focus of this research is to provide a novel approach to accident investigation theory by focusing on the investigation process itself as a complex system. A number of systemic factors inherent in this system impact on the effectiveness (accuracy, quality, validity, reliability and objectivity) of railway investigations. There is a need to explore why railway occurrences remain high in South Africa, despite railway Operators investigating occurrences. If occurrences are investigated, why then do the number of events remain unchanged? Ineffective investigations impact on the accuracy of the findings identified and the suitability of the recommendations. Added to this is the failure of implementing recommendations from investigations contributing to the high number of occurrences and repeated occurrences. Complex influencing factors inherent within the railway system influence the actual investigation process and therefore its effectiveness. This is despite interventions put in place by various organisations, industries, and sectors to improve railway safety.

A critical review of the literature, in terms of accident investigation theory, indicates that the current research targets various approaches, methods and models to determine why accidents occur; from a human, technical, or system perspective. The literature focusses on accident causation by addressing the system and its role in contributing to such events. However, very little critical analysis exists on the actual investigation process of accidents as a complex system in its own right, and its contributory role in the ongoing high number of accidents. Rasmussen's (1997) Risk Management Framework is used in this research to illustrate the South African railway system hierarchy.

A qualitative mixed methods approach using triangulation was adopted. Methods included a print media analysis of reported railway accidents, document analyses of governance documents, analyses of railway investigation reports, semi-structured interviews with railway investigators and observations of investigation inquiries. Thematic content analysis was conducted to identify the themes emerging from the data.

The results indicate that systemic factors influence the manner in which occurrences are investigated. Examples include no National Rail Policy, limited resources to investigate, shortage of skilled investigators, absence of investigator training, non-compliance to governance documents, an underinvestment in rail, financial constraints, and a blame culture. An Accimap summarises the systemic factors impacting on the effectiveness of the accident investigation process, its outcomes and the recurrence of accidents. Conclusions demonstrate that the accident investigation process is indeed an example of a complex system. Systemic factors collectively behave to influence the effectiveness of the investigation process, but also on the bigger rail socio-technical system which impacts on the safety, reliability and efficiency of the South African railway system.

The theoretical contribution of this research is identified in the useful and novel application of Rasmussen's (1997) Risk Management Framework to illustrate that the accident investigation process is an example of a complex system. Adjustments to Rasmussen's (1997) Risk Management Framework were made in order to contextualize it to the problem of this research, confirming the importance and application of Rasmussen's work in the system of accident investigations and not only in accident causation.