

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF SAFETY AND
HEALTH COSTS MODEL FOR
URBAN RAIL INFRASTRUCTURE
PROJECTS**

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Thesis submitted in fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Design and Built Environment)

Faculty of Architecture, Planning & Surveying

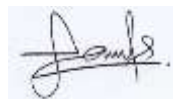
March 2020

AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Since its inception in 2011, the rapid development of the Klang Valley Mass Rapid Transit (KVMRT) System has contributed to a substantial amount of costs related to safety and health issues. Numerous scholars have analysed the two recognised typologies of safety and health costs, namely, prevention costs and accident costs. However, studies on the prevention costs during the pre-construction phase of a project are quite rare and have mainly focused on the financial losses or accident costs incurred by the contractor and victim. Many of the rail construction companies or stakeholders lack knowledge and information concerning the calculation of the costs as the existing safety cost model was developed from the manufacturing sector, and, moreover, models from the construction sector are limited to general construction. Therefore, the current research aims to develop a safety and health costs model for urban rail infrastructure projects. Using a quantitative research approach, the study proposes to (1) identify the safety and health cost components that are commonly incurred to cost bearers, (2) determine the relationship between the cost bearers and the safety and health cost factors, and (3) develop a safety and health costs model. A total of eight viaduct/guideway packages of the MRT 1 (SBK Line) project and ten viaduct/guideway packages of the MRT 2 (SSP Line) projects were examined to obtain data for the study and analysed using the Statistical Package for Social Sciences (SPSS) software. 18 informants were involved to give information related with safety and health costs. The study found that 10 components of Prevention Costs, 2 components of Direct Accident Costs and 4 components of Indirect Accident Costs were commonly incurred by cost bearers. The Client Costs were affected by the Construction Period. The Employer Costs were related to the Types of Accident Classification, the total number of Days of the Stop Work Orders, and the Location of Body Injury. The Victim Costs were related to the number of days the victims were on Medical Leave. Finally, following the validation by experts' and simulation, the safety and health costs model was successfully developed. The findings of the study offer a reliable calculator that may assist stakeholders in estimating the costs related to safety and health in construction projects, and, hence, enable them to plan their investments in terms of safety measures in a more insightful manner.

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