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IMPROVING PRODUCTIVITY IN ROAD PAVEMENT MAINTENANCE AND REHABILITATION IN NEW ZEALAND

Masters Thesis

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IMPROVING PRODUCTIVITY IN ROAD PAVEMENT MAINTENANCE AND REHABILITATION IN NEW ZEALAND

A Thesis presented in fulfillment of the requirements for the degree of Master of Construction Management

School of Engineering and Advanced Technology, College of Sciences

Massey University, Albany

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ABSTRACT

Improving the productivity of the multi-billion dollar annual investment in the maintenance and rehabilitation of the roading infrastructure could bring about huge cost savings and ensure optimal use of resources and tax payers' money. There is currently little or no research on productivity improvement of the New Zealand roading sector. This study aimed to identify productivity constraints and improvement measures in the road maintenance and rehabilitation (RMR) sector in New Zealand. The study also aimed to provide insights into the RMR process and the criteria that inform strategic decisions for action. Based on a descriptive survey method, qualitative and quantitative data were gathered through pilot interviews and on-line surveys. The investigations were limited to the views of consultants and contractors involved in the New Zealand road pavement maintenance and rehabilitation sector. Content analysis and multi-attribute methods were used in the analysis of the primary data for this research.

Results from the pilot interviews revealed 61 productivity constraint factors. These were aggregated into two main categories: internal and external factors, with an additional eight sub-categories. The five internal factor sub-groups were project finance, workforce, technology/process, project characteristics, and project management/project team characteristics. The three external factor sub-groups were statutory compliance, unforeseen circumstances, and "other" external forces.

Results of the multi-attribute analysis showed that inaccurate estimates, lack of good leadership management capacity, resistance to accept new technologies in road maintenance projects, site location and environmental constraints, and frequency of design changes/change orders/late changes were the most influential internal constraint factors on the level of productivity in the road maintenance and rehabilitation sector in New Zealand. Additionally, the Health and Safety in Employment Act, Resource Management Act, inclement weather, market conditions and the level of competition in the industry for jobs were the most significant factors under the broad category of external constraints.

Recommendations for improving productivity in the New Zealand RMR sector include providing more training courses for the workforce to participate in, in order to improve the level of skills and experience in the work force; having sufficient budget for using new technologies, such as road failure detection systems; using new cost-effective materials with a longer life cycle; providing accurate estimations; applying up-to-date leadership management skills; and improving the quality and accuracy of designs to minimise design errors and late change orders; as well as having adequate planning and regular monitoring of the entire process. It is expected that the application of these recommendations by designers, project managers and contractors could lift efficiency and productivity in the RMR sector and ensure optimal use of resources in the sector, as well as boost the New Zealand economy.

***Keywords*:** New Zealand roading industry, productivity, road construction, road pavement maintenance, road pavement rehabilitation.

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