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**PARETO ANALYSIS OF ON-  
SITE PRODUCTIVITY  
CONSTRAINTS AND  
IMPROVEMENT  
TECHNIQUES IN NEW  
ZEALAND BUILDING  
INDUSTRY**

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2011

**PARETO ANALYSIS OF ON-SITE  
PRODUCTIVITY CONSTRAINTS AND  
IMPROVEMENT TECHNIQUES IN NEW  
ZEALAND BUILDING INDUSTRY**

A thesis presented in partial fulfillment of the requirements for  
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Serdar Durdyev

2011

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## **ABSTRACT**

The steady decline in labour productivity in the New Zealand construction sector is a result of internal and external factors, which constrain the achievement of set project objectives. The main objective of this thesis is to identify the key constraints to on-site construction labour productivity based on the views of project managers, contractors and subcontractors in the New Zealand building industry. Qualitative data collected through pilot interviews formed the basis for questionnaire surveys conducted among the target populations.

Multi-attribute methods were used in the analysis of the empirical data while the Spearman's rank correlation test was used for the tests of the research propositions/hypotheses. To test the robustness of the results of the questionnaire surveys, confirmatory interviews were conducted among members of target populations, who did not participate in the earlier surveys.

Feedback from the pilot interviews revealed 56 onsite labour productivity constraint factors, which were grouped under eight broad categories: project finance, workforce, technology/process, project characteristics, project management, statutory compliance, unforeseen events, and other external forces. The first five broad categories comprise the internal constraints, while the last three were the external constraints.

Results of the analysed questionnaire surveys showed that reworks, level of skill and experience of the workforce, adequacy of method of construction, buildability issues, supervision and coordination were the most significant internal constraint factors. Among the external constraints, the Resource Management Act, ground conditions, market conditions and level of competition in the industry were found to be the most influential sub-factors affecting construction productivity in the New Zealand building industry. Project management, workforce issues and project finance were the most significant broad categories having an impact on construction productivity. Recommendations for improving onsite labour productivity in the New Zealand construction industry were made which included use of quality management systems, early involvement of specialist trades, workforce skill improvement and motivation, and effective site layout.

**Keywords:** Construction industry, On-site productivity constraints, Pareto analysis, productivity, productivity improvement.

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# STATEMENTS OF ORIGINALITY



## STATEMENT OF ORIGINALITY

### (MASTER OF CONSTRUCTION MANAGEMENT) THESIS

**TITLE: PARETO ANALYSIS OF ON-SITE PRODUCTIVITY CONSTRAINTS  
AND IMPROVEMENT TECHNIQUES IN NEW ZEALAND BUILDING  
INDUSTRY**

I declare that the above thesis is my own original work. It has not been submitted elsewhere for assessment.

The guidance received from my supervisor is hereby acknowledged. Human Ethics requirements have been complied with in accordance with Massey University research requirements.

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