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**COMPARATIVE ANALYSIS OF THE PRODUCTIVITY LEVELS
ACHIEVED THROUGH THE USE OF PANELISED PREFABRICATION
TECHNOLOGY WITH THOSE OF TRADITIONAL BUILDING SYSTEM**

2016

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A thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy (PhD)

in

Construction

School of Engineering & Advanced Technology

Massey University

Albany

New Zealand

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April 2016

STATEMENT OF ORIGINALITY

I declare that this thesis is my own work, except where due acknowledgement is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for degree or any other qualification.

Wajiha Mohsin Shahzad

ABSTRACT OF RESEARCH

Several studies have documented benefits of prefabricated building system compared to the traditional approach. Despite the acknowledged benefits of prefabrication, its application is generally low in the New Zealand construction industry. This low uptake is largely attributed to the fact that the documented benefits of prefabrication technology are anecdotal, or based on investigations of isolated case studies. This study aims to contribute to filling this knowledge gap by analysing cost savings, time savings, and productivity improvement achievable by the use of panelised prefabrication in place of the traditional building system. A two-phased mixed method of research was adopted for the study. The first phase involved the use of case study-based archival research to obtain qualitative data from records of 151 completed building projects in three cities of New Zealand – Auckland, Christchurch and Wellington. The second phase involved the use of questionnaire survey to obtain feedback from industry stakeholders. Results showed that the use of panelised prefabrication in place of traditional building system contributed to 21 percent cost saving, 47 percent time saving and 10 percent average improvement in the productivity outcomes in the building projects. Results further showed that 17 factors could significantly influence the levels of benefits achievable with the use of prefabrication technology. ‘Building type’ and ‘location’ were the factors having the most significant influence on the benefits achievable by the use of panelised prefabrication in place of the traditional building systems. Other factors that influence the benefits of prefabrication included (in diminishing order of influence): logistics, type of prefabrication, scale/repeatability, standardisation, contractor’s level of innovation, environmental impact, project leadership, type of procurement, whole of life quality, site conditions, site layout and client’s nature.

Key words: Construction, Cost, New Zealand, Prefabrication, Performance, Productivity, Time.

ETHICAL APPROVAL

Massey University Human Ethics Committee (MUHEC) granted 'Low Risk Notification' to this research project on 6 March 2013 (Appendix A).

ACKNOWLEDGEMENTS

I am immensely thankful to so many people who have been part of my PhD journey and made it possible. While I look back to write this acknowledgement, a feeling of gratitude and thankfulness is becoming more overpowering and overwhelming. This thesis would not have been possible without the participation of many wonderful people who contributed their precious time, valuable feedback and expertise to this research project. Without their incredible support I could not have accomplished it.

First, I would like to express my deepest gratitude and appreciation for my research supervisor, Dr. Jasper Mbachu, for his unstinting guidance, knowledgeable advice, unfailing support and motivation. Dr. Mbachu has remained a steadfast source of support and encouragement throughout this journey.

I would like to thank my Co-Supervisor, Dr. Niluka Domingo for her feedback and encouragement. Special thanks goes to Professor Robyn Phipps (Academic Director), Dr. Naseem Ameer Ali (Senior Lecturer), other staff and colleagues from the School of Engineering and Advanced Technology (SEAT) for their kind and continuous support.

I am grateful to the Building Research Association of New Zealand (BRANZ) for providing funding for this research. I feel extremely grateful to Dr. Wayne Sharman and Dr. John Duncan, for showing confidence in my research and providing the funding for this research.

I also wish to express thanks to Massey University Human Ethics Committee (MUHEC) for granting approval to undertake the stakeholder consultation process.

I am grateful to the organizations and individuals who participated in this research. Special thanks goes to Pamela Bell, Rosemary Scofield, John Granville, Kevin Golding, Yvonne Chen, Gary Caulfield and Sam Lomax for their useful feedback that helped to shape this study. I am incredibly thankful to Paul Mathews, Malcolm Fleming, Warren Parke, Freda Wells, Gretchen Woudt and John Walsh who worked like a bridge between members of organizations and me during the data collection process. A heartfelt thanks goes to all the project managers and quantity surveyors who extended their support, dedicated their time and shared the data required for this research.

In the end, I would like to acknowledge the support that my family extended to me. First and foremost, I would like to say thanks to my mother Khalida Gulzar, whose prayers and encouraging words kept me motivated. I am thankful to my brothers Zubair and Hassan who always cheered me up and looked after me.

I am so blessed to have my boys Muhriz, Mohid and Munahid in my life. When they smile at me and give me a hug, my worries are gone and when they cheer, the whole world around me looks so beautiful. I love them for helping to make my life meaningful.

Thank you cannot truly address all that my husband Mohsin has done during the decade of our togetherness. All I will say is I would not be the person I am today if we were not together. Many heartfelt thanks to you Mohsin. And many heartfelt thanks to you all.

DEDICATION

To my amazing parents

Khalida Gulzar & Gulzar Ahmed

LIST OF ABBREVIATIONS

ACENZ	Association of Consulting Engineers New Zealand
ANOVA	Analysis of Variance
BCSPT	Building and Construction Sector Productivity Taskforce
BRANZ	Building Research Association of New Zealand
CRC	Cooperative Research Centre
DBH	Department of Building and Housing
GFA	Gross Floor Area
IPENZ	Institute of Professional Engineers New Zealand
JIT	Just in Time
LVL	Laminated Veneer Lumber
NZIA	New Zealand Institute of Architects
NZIOB	New Zealand Institute of Builders
NZIQS	New Zealand Institute of Quantity Surveyors
MBI	Modular Building Institute
MNOVA	Multivariate Analysis of Variance
MUHEC	Massey University Human Ethics Committee

OECD	Organization of Economic Co-operation and Development
OSM	Off-Site Manufacturing
PCA	Principle Component Analysis
Prefab	Prefabrication
RMBF	Registered Masters Builders Federation
SPSS	Statistical Package for the Social Sciences
TBS	Traditional Building System
UK	United Kingdom
USA	United States of America

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