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Enhancing Research Methodologies in the Built Environment & Engineering

VOLUME 1: PROJECT MANAGEMENT & TECHNOLOGY

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Preface

Assalamualaikum Warahmatulahi Wabarakatuh,

First and foremost, I wish to welcome all of you to the International Conference on Research Methodology for Built Environment and Engineering (ICRMBEE2013) and "Selamat Datang" everyone. I am greatly honoured and glad that the Faculty of Architecture, Planning and Surveying, Universiti Teknologi MARA (UiTM) is organizing this conference. Faculty of Architecture, Planning and Surveying wishes to thank the university and supporting bodies for their trust, confidence and continuing support towards us.

This conference with the theme "Enhancing Research Methodologies in The Built Environment & Engineering" bringing together so many experts from around the world is an important opportunity. Not only, does it interact with the many facets of this faculty but it comes at a time when modernizing of the Malaysian construction industry is under close scrutiny. This is contained in the 10 year master Plan produced by the Construction Industry Development Board Malaysia (CIDB). With this as a back draft to your deliberation, I am certain that your contributions of knowledge and debate in the conference will be extremely valuable.

Lastly, I would like to thank all the committee members for their hard work and excellent job in ensuring the success of this conference.

Thank you

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Relationship between Labour Productivity and Design Characteristics in High-rise Buildings

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ABSTRACT

Formwork installation, rebar fabrication/installation, and concrete casting are often repetitive in high-rise building projects. Previous studies have shown that labor productivity is significantly affected by many reasons. This study aims to consider the relationship between average labor productivity and design characteristics in typical floors of high-rise building projects. Data were collected through questionnaire which was distributed to experts and experienced people in construction projects. A neural network model was developed to estimate labor productivity. The main result is the comparison between predicted and actual labor productivity for typical floors. The Mean Absolute Percentage Errors (MAPE) are less than 3.5%, and R-squared indices are greater than 85% for all three activities mentioned above. These results showed that the model developed in this study is very appropriate when predicting labor productivity in high-rise building projects.

Keywords: labor productivity; high-rise building; design characteristics; artificial neural network; Vietnam

INTRODUCTION

Labor productivity in construction industry has been long studied by many previous researchers. Kometa and Olomolaiye (1997) have conducted a work sampling at seven project sites for formwork and rebar installation activities to identify the real working days as follows: 51% for masonry team, 44% for formwork team, and 56% for rebar team. Their study has also indicated that there are three factors which mostly affect the productivity of labor team including lack of materials, inappropriate equipments, and repetitive activities. In addition, Thomas and Sanvido (2000) have considered the quantitative effect of fabrication on productivity in three cases: installation of canopy and door, erection of outside wall panel, and steel pile driving. The result was labour productivity increased respectively 16.6%, 28.4% and 56.8%. Furthermore, David and Hanna (2005) further studied the absence of workers in an electrical construction site. They have claimed that when the rate of absence is from 6% to 10%, the productivity will decrease approximately 24.4%, and when rate of absence is from 0% to 5%, there is no productivity loss. On the other hand, construction productivity has been increased approximately between 5% and 20% due to floor repetitions or successive activities as studied or reported by the United Nations 1965, Thomas *et al.* 1986, Everett and Farghal 1994, Couto and Teixeira 2005, Jarkas 2010, Stefan and Kim 2010, and Long and Hung 2012.

Unfortunately, Oglesby *et al.* (1989) stated that there is probably no standard method to measure the labour productivity due to the complexity of operations and relations in a construction site, and the labour productivity is different in each type of building structures. A few researchers have attempted to consider factors affecting labour productivity and to propose some methods for

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