NON LINEAR FAILURE OF CORBEL FOR IBS BLOCKWORK

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A project report submitted in partial fulfilment of the

requirements for the award of the degree of

Master of Engineering (Civil - Structure)

Faculty of Civil Engineering

Universiti Teknologi Malaysia

JANUARY, 2014

Istimewa buat,

Ayah dan Ibu yang disayangi
Terima kasih di atas segala pengorbanan dan kasih sayang yang kalian curahkan,
Selagi jasad dikandung badan, dirimu tidak kulupakan.

Yang diingati,

pensyarah-pensyarah yang dihormati yang tidak henti memberi ilmu,

Rakan-rakan seperjuangan,

Segala kenangan & ranjau yang kita lalui bersama,
Sentiasa terpahat di sanubari ini,
Semoga kita mencapai segala yang kita hajati,
Di dunia dan di akhirat.

"Sesungguhnya yang baik itu datangnya dari ALLAH S.W.T, dan yang buruk itu datangnya dari kekhilafan saya sendiri"

ACKNOWLEDGEMENT

Alhamdulillah, thanks to the Almighty for his mercy and love that has been showered, I was able to complete the master project successfully. A special thanks goes to my master project supervisor, Assoc. Prof. Dr. Abdul kadir bin Marsono who has given a lot of guidance in completing this project. Next, unforgettable friends, Muhamad Hilmi Naim bin Yakin and Zakaria bin Baderul Hisham who have worked very hard and provides a lot of views and advices in completing this project. Finally, for beloved mother and father, Abdul Latif bin Ali and Norhayati binti Jafar that give a lot of advice, provide motivation and supportive in completing this project.

ABSTRAK

Teknologi IBS tumbuh pesat di seluruh dunia. Salah satu topik yang kerap dibincangkan sekarang ialah gabungan blok konkrit yang fleksibel untuk membentuk sebuah rumah dengan cepat. Kajian ini membincangkan tentang blok konkrit berbentuk L dan T dalam skala penuh. Perisian unsur terhingga, Autodesk Multiphysics digunakan untuk menghasilkan model blok konkrit tersebut. Mekanisme gagal blok konkrit telah diperolehi dengan membandingkan keputusan antara ujian eksperimen dan perisian unsur terhingga. Ujian makmal adalah untuk mencari kriteria kegagalan pada titik-titik tertentu dalam tiga kitaran beban. Dari anjakan, pekali geseran boleh ditentukan. Keputusan menunjukkan bahawa mekanisme kegagalan daripada model adalah sama seperti ujian makmal. Tetapi, peratusan anjakan antara ujian makmal dan perisian analisis unsur terhingga adalah terlalu besar dan pekali geseran tidak dapat dikira.

ABSTRACT

IBS technology grows rapidly around the world. One of the frequent topic discuss now is the flexibility of blockworks are to be assemble to form a house quickly. This study present the behaviour of T-shape and L-shape full scale blockwork. The Autodesk Multiphysics finite element software was used to develop the blockwork element modelling. The mechanism of failure was obtained by comparing the results between experimental and finite element analysis output. The laboratory test was to find the failure criteria at certain load levels within three load cycle approach. From the displacement obtained, the coefficient of friction can be determined. The result shown that the mechanism of failure obtain from modelling is similar as laboratory test. But, the percentage different between laboratory test and finite element analysis software was far too great and the coefficient of friction could not be calculated.

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INTRODUCTION

1.1 Introduction

Industrialized Building Systems (IBS) is a method which enables a construction to move away from the conventional labour intensive method of construction to a more manufacturing based. With this approach, components of the building are manufactured off-site (in modules) and brought on site to be assembled. The standardization of elements and fittings of houses will ultimately lead to an increase in efficiency, better quality and less wastage of time and materials. Most importantly it will provide for a lower cost structure. The cost structure is important here as affordable housing can be built to support the government's low-income housing schemes.

IBS technology grows rapidly in Malaysia. There are many research has been conduct in Malaysia to introduced a more suitable system accordance to the regulation and standard in order to support the government low-income housing schemes. One of the frequent topic discuss now is the concrete block or more known as blockwork. The blockwork are interlocking system without the need of mortar at the top and the

bottom of the block such as the conventional block which make the construction more economical.

1.2 Problem Statement

The building consists of the concrete block has been proven to be safe and reliable to receive the similar load as a conventional or construction. In Indonesia, earthquake load occurs frequently and there are many rural areas are destroyed due to ignoring seismic load in designing the building. This project was to conduct representative test of IBS Blockwork System to fing the strength that created by the sliding and uplifting of blocks such that it is suitable to be use in earthquake zones.

1.3 Objective

The objective of this study is:

1. To test the blocks models of T shape and L shape as a part of IBS blockwork system in the laboratory.
2. Compare the mechanism of failure of blockwork to finite element modelling at loaded state.
3. Determine the coefficient of friction for block to slide between the others to create strength during its use.

1.4 Scope of Study

In this study, L shape and T shape blockworks was tested and analyzed using the Finite Element Analysis Software. Dimensions and characteristics of the models are similar as built in the laboratory. The result was to fing the similarity of behavior between the modelling methods to obtain the reliable results of strength for IBS blockworks.

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