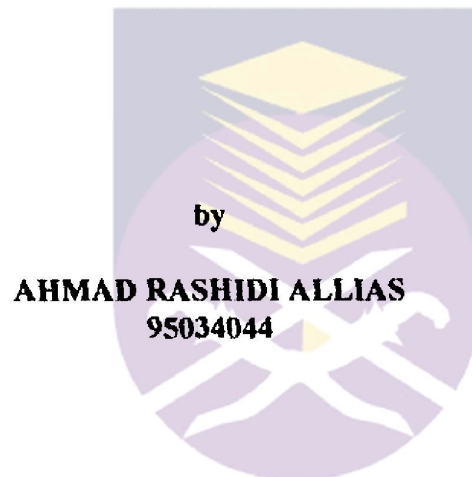


**NONLINEAR BEHAVIOUR OF WAFFLE
SLAB UNDER CONCENTRATED LOAD**



**A Report Submitted to the Faculty of Civil Engineering
in Partial Fulfilment of the Requirements for the award
of a Degree in Bachelor of Engineering (Honours) (Civil)**

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ABSTRACT

This study is to investigate the nonlinear behaviour of prestressed waffle slab under concentrated load by using computer software namely ANalysis SYStem version 5.0. Three specimens of prestressed waffle slabs, WSCL1 (4 equal waffles), WSCL2 (9 equal waffles), and WSCL3 (16 equal waffles) are modeled and analysed using finite element analysis (FEA).

The nonlinear behaviour of the three prestressed waffle slabs are compared with the results of experiments conducted by Khairul Amali (July 1991). Results are interpreted in term of load-deflection relationship, stress distribution and stress-strain behaviour.

The behaviour of the waffle slab specimens were bounded by the influences of transducer locations and numbers of ribs involved in the quadrant. In this study, the finite element analysis considered similar points to which deflections and strains are measured.

The overall strength of the three specimens relied totally on the prestressed rib existence and locations and the FE models produced similar results as reported earlier (Khairul Amali, July 1991).

1.0 INTRODUCTION

1.1 STATEMENT OF PROBLEM

Current usage of waffle slabs is only limited and mainly applied to bridge slab construction. To enable diversification of waffle slab application, there is a need to study their behaviour subjected to loadings.

In addition to having the total dead weight of the structure being reduced, the variation on numbers of ribs would help to improve the structural behaviour of the waffle slab.

1.2 OBJECTIVE OF STUDY

The objective of this study is primarily to analyse the non-linear behaviour of three waffle slabs under the action of applied concentrated load using a computer software namely ANSYS Ver.5.0. A linear finite element analysis had been carried out earlier as reported by Nik Rulazman (May 1995)

The waffle slabs will be examined with respect to:-

- i) Load-Deflection relationship
- ii) Stress distribution
- iii) Stress-Strain behaviour

A comparison could be made against measured values obtained from earlier lab research by Khairul Amali (July 1991).