A PROJECT REPORT SUBMITTED TO THE
SCHOOL OF ENGINEERING IN PARTIAL
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FOR ADVANCED DIPLOMA IN CIVIL ENGINEERING

PHYSICAL PROPERTIES OF GLUE

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ABSTRACT

The works cover in this final year project is to determine the Modulus of Elasticity, $\mathcal{E}$ and Poisson's ratio, υ of glue due to tensile load. The experimental laboratory tests consist of determining the Modulus of Elasticity with different duration time, day. The results' data from the experimental analysis i.e Modulus of Elasticity will be used in the finite element analysis with various values of Poisson's ratio and will results the different value of stresses and displacements. The plotted graph for Poisson's ratio vs. displacement will give the Poisson's ratio value for that Modulus of elasticity. The analysis of wood joint covers the butt joint analysis.

Isoparametric solid 2-D element i.e plane 42 is used in the analysis.Linear finite element model and the aspect ratio is limited to 1:10 were in order to reduce the errors.

It was found that the value for Modulus of Elasticity increase with the increase of Poisson's ratio.

CONTENTS

CHAPTER 1

INTRODUCTION

1.0 GENERAL

Glue laminated timber (glulam) is a structural member form by gluing smaller pieces of wood normally called laminate. It is therefore possible to manufacture structural timber into complicated shapes, either in straight or curved form. In most of the industrialised world nowadays, the demand for larger size structural wood members are growing. The technological advances made in processing has led to ability to fabricate structural members are being used in a wide range of applications, and under equally diverse conditions. *(Pellinece, P.J. and Moody, R..C. , 1988).*

The works cover in this thesis is to investigate the physical properties of glue that are able to applied in the theoretical analysis of glue laminated structures in future. The linear and non-linear behaviour of glued under certain clamping pressures and curing time needs to investigated.

The *Modulus of Elasticity, E* and *Poisson's ratio, v* are the two main parameters need to be investigated which are also the primary data to be input in the finite element analysis in the glulam structures.

1.1 OBJECTIVE OF STUDY

The main objective of this study is :-

i) To determine the value of Modulus of Elasticity, E and Poisson's ratio, v and tensile strength of glue due to tension load,