



FINAL YEAR PROJECT REPORT
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SHAH ALAM SELANGOR DARUL EHSAN

STRESS CONCENTRATION FACTORS
ON GLUED JOINTS OF TIMBER

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ABSTRACT

The project comprises the Finite Element Analysis of the glued joint of timber under tensile loads with different tip thickness, slope and finger length. The analysis of the timber glued joint covers the single and mini finger joints.

The failure of timber glued joint such as finger joint under tension load is not solely depends on effective area of the cut section. The effect of notches and holes influenced the failure load due to the stress concentration besides the notches and holes.

The stress concentration reduces the failure load of the timber glued joint. The stress concentration factor for the glued joint should be included in order to obtain a correct net strength of the glued joint.

The coefficient of stress concentration can be determined with the finite element method as a two-dimensional elastic problem by analysing the maximum and minimum stresses around the joints. The modulus elasticity, E of the joint also can be obtained by analysing the displacement of the joint to get the stress-strain relationship.

It is can be concluded that when the tip of finger joint increases the stress concentration factor decrease and therefore the tensile strength reduces.

CHAPTER 1

INTRODUCTION

1.1 GENERAL

At present, structural timber is mostly used in the form of solid members in temporary or semi - permanent structural. To encourage greater usage of timber for permanent structural applications, built-up timber structures with large cross-sections such as in the case of glued laminated timber (glulam) structures must be promoted.

(Mansor et.all, 1993)

Glued - laminated timbers or glulam refer to two or more layers of wood glued together with the grain of all layers or laminations appoximately parallel. The laminations may vary as to species, number, size, shape and thickness. The individual laminations cannot exceed 2 inches in thickness and are typically made from nominal 1 inch or 2 inch sawn lumber. Glulam timber is an engineered, stress rated product of a timber laminating plant, comprising assemblies of suitably selected and prepared wood laminations securely binded together with approved adhesives.

Any species can be used for laminating provided its mechanical and physical properties are suited for the purpose. Standards already exist for many softwoods are Douglas Fir-larch, Southern pine, Herm-fir and Sitka spruce. While in Malaysia commonly used species groups of hardwoods are Meranti, Kempas and Keruing.