



MARA UNIVERSITY OF TECHNOLOGY

EFFECT OF GAP INFRONT THE FINGER TIP ON  
TENSILE STRENGTH OF FINGER JOINT

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# TABLE OF CONTENTS

<b>CONTENTS</b>	<b>PAGE</b>
<b>ACKNOWLEDGEMENT</b>	<b>i</b>
<b>TABLE OF CONTENT</b>	<b>ii</b>
<b>LIST OF TABLES</b>	<b>v</b>
<b>LIST OF FIGURE</b>	<b>vi</b>
<b>ABSTRACT</b>	<b>viii</b>
<b>CHAPTER 1</b>	
<b>INTRORUCTION</b>	
<b>1.1 General</b>	<b>1</b>
<b>1.2 Objective of study</b>	<b>2</b>
<b>1.3 Scope of Study</b>	<b>2</b>
<b>1.4 Outline of the thesis</b>	<b>4</b>
<b>CHAPTER 2</b>	
<b>LITERATURE REVIEW</b>	
<b>2.1 General</b>	<b>5</b>
<b>2.2 Tensile Strength of Finger Joint</b>	<b>5</b>
<b>2.2.1 Tensile Test</b>	<b>7</b>
<b>2.3 Factors Effecting the Finger Joint Strength</b>	<b>8</b>
<b>2.3.1 Pitch</b>	<b>8</b>
<b>2.3.2 Length</b>	<b>8</b>
<b>2.3.3 Slope</b>	<b>9</b>
<b>2.3.4 Width</b>	<b>9</b>
<b>2.3.5 Gap</b>	<b>9</b>
<b>2.4 Finite Element Analysis of glued joint</b>	<b>10</b>
<b>2.5 Finger Joint Arrangement</b>	<b>10</b>
<b>2.6 Phenol-Resorcinol Formaldehyde (PRF)</b>	<b>11</b>
<b>2.7 Conclusion</b>	<b>15</b>

## **ABSTRACT**

The finger joint are considered as the best configuration of end connection of timber, because their geometrical shape and appearance. The problem in finger joint connection is that the tensile strength is less compared to normal uncut timber member. One of the factor is due to the existing of gaps infront of the finger tip in the finger joint. The gaps are normally filled with glue which is weak in tensile strength. Therefore the gap built up that stresses concentration which may lead to failure of the joint. The project covers the Finite Element analysis of the wood joint under tensile loads with different lap length, tip and gap thickness. The analysis of the wood joints covers the mini finger joint.

It was found that the value of stress at location A and B is linearly decreased with the thickness of gap increased. But maximum stress at location C increased with the thickness of gap increased.

# CHAPTER 1

## INTRODUCTION

### 1.0 INTRODUCTION

#### 1.1 General

Glue finger joints are considered as the best glued end joint in timber construction. The strength of the joint among other is influenced by the ratio of  $t/p$ ,  $L/p$  and the stress concentration at the tip. Finger joint strength also depends on the type and configuration of joint and the manufacturing process. High strength finger joint can be made when the design is such that the fingers have relatively sharp tips ( $t$ ).

A study also made to determine factors effecting shrinkage of the adhesive layer (gap) can be reflected in the thickness function. Phenol Resorcinol-formaldehyde (PRF) exhibited the best behavior give slightly higher strengths but with a limitation on maximum thickness.

The joint strength theoretically should approach the tensile stress of the wood, discounting the stress losses caused by effect of the stress concentrations that probably occur at the finger tips. Mini finger joint will be needed as the computer modeling and the efficiency of the joint will be examined and compared with the experimental results.

The work cover in this thesis is on the finite element analysis of the finger joint based on the species of Light Red Meranti. The works try to investigate the efficiency of glue finger joint under the effect of joint geometry and width of clearance influent of the tip and gaps.