

HIGHER TECHNICAL INSTITUTE

M. L. P. I. A.

CIVIL ENGINEERING DEPARTMENT

DIPLOMA PROJECT

**AN INVESTIGATION INTO THE MECHANICAL
BEHAVIOUR OF FLITCHED BEAMS**

**IOANNOY KYPRIANOS
MAKRIS STAUROS**

c/972

2003

HIGHER TECHNICAL INSTITUTE	PROJECT NO. <i>3384</i>
----------------------------------	----------------------------

1.1 HISTORY OF TIMBER

Timber framing, has been around for about two thousand years, spanning the globe and showing up in Japanese temples, English manor homes and American farms. Despite its wide use, however, it wasn't until the 10th century that a completely self-supporting system was developed, eliminating the need to sink poles into the ground where they were exposed to rot. From this new system evolved a look that was to dominate domestic architecture for the next nine centuries.

Early timber framing homes required long, arduous work, involving the use of axes, adzes and chisels, as well as a host of other tools relying solely on muscle power. Despite the toil, however, post-and-beam had definite advantages. Unlike log homes that were completely made of wood, timber frame walls used in fills of mud, brick or other material, which could then be plastered over. This gave a much lighter appearance, and cut down on the use of timber where it was scarce. Post-and-beam was therefore preferred over other methods.

Without the use of modern techniques, however, timber-framing homes remained out of reach for most people. This all changed with the discovery of the New World. Over time, a uniquely American style took shape, introducing innovations that reduced timber usage and emphasized simplicity and functionality, making timber framing affordable. Another new ingredient was the invention of large predesigned frame units, which a community could fit together and raise in a day. While construction crews have replaced the community's role in this respect, the efficiency handed down through this method remains.

The most important advancement in timber frame construction has probably been the introduction of energy efficiency. Today's timber framing homes often feature large southern windows for passive solar heating, easily circulating air and insulated roof panels that form an airtight sheath. The result is some of the best insulated, most energy efficient homes in existence today.



CONTENTS

	<u>page</u>
<u>1.TIMBER & STEEL PROPERTIES</u>	1-15
1,1.History of timber.....	1
1,2.Timber properties.....	3
1,3.Durability of timber and durability classes.....	4
1,4.Strength of timber.....	7
1,5.Moisture control.....	8
1,6.Chemical resistance.....	10
1,7.History of steel.....	11
1,8.Properties of iron.....	13
<u>2. COMPOSITES-FLITCHED BEAMS IN CIVIL ENGINEER</u>	
2,1.Indroduction.....	16
2,2.What are composites.....	18
2,3.Grade stress.....	21
2,4.procedure followed during the course of the project.....	22
<u>3.DATA ANALYSIS</u>	23-48
3,1.Technical glossary.....	23
3,2.Formulae used in the project.....	24
3,3.Data analysis for 1m timber.....	25
3,4.Data analysis for 2m timber.....	39
<u>4.GENERAL REMARKS & CONCLUSIONS</u>	49-51