



UNIVERSITI
TEKNOLOGI
MARA

FABRIC AND TENSILE STRUCTURE: THE SUITABILITY IN MALAYSIA CLIMATE

This dissertation report is submitted in partial fulfillment requirement to obtain:
Bachelor of Building Surveying (Hons)

MOHD. KHAZANI B. HJ. DARAWI
Bachelor of Building Surveying (Hons)
2005362044

Building Surveying Department
Faculty of Architecture, Planning and Survey,
MARA University of Technology,
Shah Alam, Selangor Darul Ehsan.

Acknowledgements

This dissertation would not have been possible without the assistance and cooperation of many individuals and institutions. First, I want to thank to The Almighty God, because of his blessing, I have finish my assignment. I thank my advisor Sr. Ghazali b. Mohd Amin who guided me through this difficult endeavor and showed me new paths to carry out research in fabric and tensile structure. I am indebted to Ir. Mohammad Farid bin Mohd Nor, Assistance Manager of Engineering Department of Bukit Jalil Sport Complex who arrange my visit to Bukit Jalil Sport Complex. I also have been graciously helped by Ir. Syamsul b. Ab. Rahman also from Engineering Department of Bukit Jalil Sport Complex who helped me in the analysis of data and gave me very useful brief about fabric and tensile structure. Special thanks to Irwan bin Kamaruddin in guiding me on surveying around Bukit Jalil Sport Complex.

To who provided support in the physiological aspects of this work, Norinayah Bukhary binti Ismail Bukhary. Thanks to Ir. Shahiq bin Mohamed and Ar. Jais Ab. Rahman, from KLIA Consultancy Services Sdn. Bhd. for their advices and useful comments, thanks a lot to Mr. Razak from Security Department of Guthrie Pavilion who help me to get permission to visit and do some research around the Guthrie Pavilion building.

I extend my thanks for their help and friendship to Mohd Faisal Jaini, Mohd. Nazim Bong Ali, Hafiz Ludin, and Afzaniza Ghazali from

Abstract

This dissertation is a study to find out the advantages and disadvantages of using tensile structure in Malaysia as a tropical country. The strengths and weakness of the system have been identified, regardless of whether it is a small or big scale structure.

Fabric, tensile and membrane structures can be developed and exploited in a wide variety of tensile based systems. A tension structure may be fabricated as a permanent or temporary structure for commercial or residential use, public assembly tent structures, temporary event structures, modular industrial construction and landscape artwork.

Tensile structure shade canopy is typically used as a lightweight roof, protective cover, shelter, skylight, advertisement and/or identification for stadiums, arenas, shopping malls, amphitheaters, band shell, stage cover, tents, and shade structures for airport and transportation depots.

The attributes of tensile membrane structures can be developed and exploited in a wide variety of tensile based systems, provided that there are proper maintenance and right materials.

Observation on the structures and the materials, interview with regular users had revealed the disadvantages. The beautiful designs now no longer look good because of the faded and dull tensile structures.

	Page
Acknowledgment	i
Abstract	iii
Table of Contents	v
List of Figures	viii
List of Tables	xi

Contents

Chapter 1.0	1
<i>Introduction</i>	
1.1 Preface	2
1.2 Issue of the topic	3
1.3 Objective of study	5
1.4 Scope of study	6
1.5 Methodology	7
1.6 Arrangement of chapter	9
Chapter 2.0	11
<i>Background of fabric and tensile structure</i>	
2.1 Introduction to fabric and tensile structure	12
2.2 History of the system	15
2.2.1 Rural tents	15
2.2.2 Urban tents	19
2.2.3 Modern tents	20
2.3 Performance of the system	22
2.3.1 Wind	22

2.3.2	Sun	22
2.3.3	Fire	24
2.3.4	Rain	24
2.3.5	Vandalism	24
2.3.6	Cleaning	24
2.3.7	Thermal insulation	25

Principle of the structural system

2.4	Tensioned fabric structure	26
2.4.1	System concept	27
2.4.2	Basic shapes of fabric	29
2.4.3	System behavior	32
2.4.4	Advantages and disadvantages	34
2.5	Typical elements in the system	38
2.5.1	Properties of membrane and materials	38
2.5.2	Structural details	44
2.6	Design and construction	48
2.6.1	Finding form	50
2.6.2	Installation	54
2.6.3	Maintenance	56

Chapter 3.0 **57**

Tensile structure in Malaysia climate

3.1	Introduction	58
3.2	Suitability to local climate	59
3.2.1	Environmental effects	59
3.2.2	Suitability in term of function	63