

ACOUSTICAL FINISHES IN AUDITORIA

YASMIN OMAR LIAN

99114803

**DEPARTMENT OF BUILDING SURVEYING
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING
UNIVERSITY TECHNOLOGY MARA
SHAH ALAM
SELANGOR DARUL EHSAN**

APRIL 2001

ACOUSTICAL FINISHES IN AUDITORIAUM

CONTENT	PAGE
CONTENT	i-v
ACKNOWLEDGEMENT	vi
ABSTRACT	vii
LIST OF CHART	viii
LIST OF FIGURE	ix
LIST OF PHOTO	x
LIST OF TABLE	xi
1.0 INTRODUCTION	1.1
1.1 PREFACE	1.1
1.2 ISSUES	1.2
1.3 OBJECTIVE	1.2
1.4 SCOPE	1.2
1.5 THE METHODOLOGY OF STUDY	1.3
1.6 CONCLUSION	1.4
2.0 DESIGN AND DEVELOPMENT	2.1
2.1 INTRODUCTION	2.1
2.2 WHAT IS ACOUSTICS	2.3
2.3 ACOUSTICS BACKGROUND	2.3
2.4 AUDITORIUM PLATFORM OR STAGE	2.9

2.5	AUDITORIUM AND STAGE RELATIONSHIP	2.10
2.5.1	360° encirclement	2.12
2.5.2	210° – 220° encirclement	2.14
2.5.3	180° encirclement	2.16
2.5.4	135° encirclement	2.17
2.5.5	90° encirclement	2.19
2.5.6	Zero encirclement	2.20
2.6	THE EFFECT ON THE DEGREE OF ENCIRCLEMENT	2.21
2.7	THE AUDITORIUM IN SECTION	2.22
2.8	AUDIENCE SEATING	2.25
2.9	SIGHTLINES	2.30
2.9.1	Anthropometrics	2.31
2.9.2	Seat spacing	2.32
2.9.3	Design of chair	2.33
3.0	FINISHES	3.1
3.1	INTRODUCTION	3.1
3.2	DESIGN OF FINISHES	3.2
3.3	AUDITORIUM ACOUSTICS	3.6
3.3.1	Direct Sound and Early Reflections	3.7
3.3.2	Calculating Reverberation Time	3.9
3.3.3	Criteria for Good Acoustics	3.9
3.4	ACOUSTICAL MATERIALS	3.11
3.5	CEILING	3.19
3.5.1	Ceiling Voids	3.22
3.5.2	Suspended Ceiling	3.22
3.5.3	Material Installation	3.23
3.6	WALL CONSTRUCTIONS	3.26
3.6.1	Blockwork	3.27
3.6.2	Brickwork	3.28
3.6.3	Partitions	3.28
3.6.4	Folding Partitions	3.29

3.7	TYPE OF FLOOR	3.30
	3.7.1 Absorption and insulation	3.34
	3.7.2 Theatre and Auditorium Chair	3.43
3.8	CRITERIA FOR DIFFERENT BUILDING TYPES	3.44
	3.8.1 Cinemas and Multiplexes	3.44
	3.8.2 Concert Hall	3.45
	3.8.3 Theater	3.47
4.0	NOISE CONTROL	4.1
4.1	DEFINITION OF NOISE	4.1
4.2	BASIC ACOUSTIC TERMINOLOGY	4.1
4.3	NOISE SOURCES	4.5
	4.3.1 Central Plant	4.5
	4.3.2 Noise in Airflow System	4.5
	4.3.3 External Noise	4.6
4.4	ASSESSMENT OF ROOM SOUND LEVEL	4.7
	4.4.1 Outside Noise Environment	4.7
	4.4.2 Internal Noise Environment	4.8
4.5	CONTROL OF NOISE	4.9
	4.5.1 Planning to Control External Noise	4.9
	4.5.2 Planning to Control Internal Noise	4.10
	4.5.3 Use of Mass	4.10
	4.5.4 Use of Isolation	4.11
	4.5.5 Control of Flanking Transmission	4.12
	4.5.6 Quality of Detailing	4.12
4.6	NOISE	4.13
4.7	CONCERT HALL DESIGN	4.16
	4.7.1 Acoustical Trend and New Possibilities	4.17
	4.7.2 Computerised Acoustical Design	4.19

ABSTRACT

This dissertation was also carried out to determine the type finishes executed in auditoria. Boundary finishes in auditorium is necessary in ensuring an auditorium perform its functional and maintain its existing for as long as it can. It is therefore important that finishes design should not only be technologically up-to-date, but last and withstand to the numerous changes in the way performance are being staged. A theatre has to be protected from all external noise and must have mechanical plant designed so that the background noise level does not exceed certain criteria.

Acoustics is more an art than a science. Designing spaces, particularly auditoria is a difficult process and needs a competence person. It is acoustical environment implied by design and choices of material. Some boundary finishes should be lined with sound – absorbing material while other on reflective surfaces. The focus on the Istana Budaya and Dewan Filharmonik KLCC were found to have good effects on different acoustical and some similar material for sound absorption and insulation. Istana Budaya is a multipurpose auditorium which concentrates on theatrics and vocal performances. The Philharmonic KLCC is designed specifically for instrument and vocal performance such as orchestra performance.