

TABLE OF CONTENTS

TITLE SHEET	iii
VALIDATION SHEET	ii
DECLARATION	iii
DEDICATION LETTER	iiiiv
PREFACE	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	xi
APPENDIX	xiii
ABSTRACT`	xvi
CHAPTER I	1
INTRODUCTION	1
1.1 Background	1
1.2 Formulation of the Problem	3
1.3 Goal	4
1.5 Advantage	4
1.6 Limitation	4
1.7 Authenticity	5
CHAPTER II	7
LITERATURE REVIEW	7
2.1 Overview of Underground Station Structures Analysis	7
2.1.1 Overview of underground station aspects	7
OO2.1.2 Constituent elements	7
2.1.3 Modeling of underground structures	11
2.2 Overview of Underground Station Structure Design	13
2.2.1 Effect of construction stages in the design of underground station structures	13
2.2.2 Modeling	14
2.2.3 Seismic design criteria	14
CHAPTER III	15

THEORITICAL FRAMEWORK	15
3.1 Nonseismic Loading Analysis	15
3.1.1 Dead load.....	15
3.1.2 Live load.....	15
3.1.3 Load due to soil and groundwater around the building.....	15
3.2 Nonseismic Structure Boundary Condition	19
3.3 Earthquake Analysis for Underground Structure.....	22
3.3.1 Nonlinear analysis of site response	23
3.3.2 Boundary condition of seismic structure.....	25
3.3.3 Seismic Loads.....	26
3.4 Building Design Standard.....	29
3.4.1 Earthquake criteria design	29
3.4.2 Review of bending capacity	30
3.4.3 Review of shear capacity.....	31
3.5 Ground Support Capacity	32
CHAPTER IV	33
RESEARCH METHOD.....	33
4.1 Preliminary.....	33
4.2 Research Stages	33
4.3 Use of Rules	39
4.4 Structure Description	39
4.5 Structure and Material Parameters.....	40
4.6 Soil Parameter.....	40
4.7 Modeling Steps	42
4.8 Use of Research Support Programs	44
CHAPTER V.....	46
RESULT AND DISCUSSION	46
5.1 Preliminary.....	46
5.2 Modeling According to Drawing.....	46
5.3 Nonseismic Structural Analysis.....	47
5.3.1 Nonseismic boundary condition.....	48
5.3.2 Dead load.....	50

5.3.3	Live load	53
5.4	Seismic Structure Analysis	64
5.4.1	The boundary condition of the seismic structure	67
5.4.2	Soil displacement forces	71
5.4.3	Inertial forces	72
5.4.4	Peripheral shear forces	73
5.4.5	Hydrodynamic forces	74
5.5	Load Factor and Load Combination	74
5.6	Discussion	73
5.6.1	Results of nonseismic and seismic analysis	74
5.6.2	Analysis of soil bearing capacity	84
5.6.3	Comparison of research analysis with the planner analysis	85
3.6.4	Design of bending capacity	86
3.5.3	Design of shear capacity	89
CHAPTER VI	.....	92
CONCLUSION AND SUGGESTION	.....	92
6.1	Conclusion	92
6.2	Suggestion	93
BIBLIOGRAPHY	.....	94
APPENDIX 1	.....	97
APPENDIX 2	.....	104
APPENDIX 3	.....	102
APPENDIX 4	.....	113
APPENDIX 5	.....	116
APPENDIX 6	.....	120
APPENDIX 7	.....	120