



CONTENTS

APPROVAL	ii
STATEMENT.....	iii
PREFACE	iv
CONTENTS.....	v
LIST OF TABLES	viii
LIST OF FIGURES	ix
ABSTRACT.....	1
CHAPTER 1 INTRODUCTION.....	1
1.1. Background	1
1.2. Problem Statement	4
1.3. Research Objectives	4
1.4. Limitations	4
1.5. Benefit	4
1.6. Originality	5
CHAPTER 2 LITERATURE REVIEW.....	7
2.1. Earthquake	7
2.1.1. Earthquake source zone	7
2.1.2. Fault Mechanism	8
2.2. Seismic Waves	9
2.3. Strong ground motion.....	10
2.3.1. Amplitude	10
2.3.2. Response Spectrum	10
2.3.3. Duration	11
2.4. Local Site Effect.....	11
2.4.1. Amplification.....	11
2.4.2. Case histories	12
2.5. Site Response Analysis	14
2.5.1. Simulation of site response.....	15
2.5.2. Cyclic soil behaviour	16
2.6. Liquefactions	17



CHAPTER 3	THEORETICAL BACKGROUND	19
3.1.	Geologic and Tectonic activity in the Special Region of Yogyakarta	19
3.2.	Site Response Analysis with DEEPSOIL V7	23
3.3.	Time-domain analysis	23
3.4.	Parameterization of Nonlinear Soil Behavior	24
3.5.	Excess pore pressure	25
3.6.	Maximum layer thickness	27
3.7.	Dynamic Properties of Soils.....	27
3.7.1.	Shear wave velocity (V_s)	27
3.7.2.	Modulus reduction (MR) dan damping ratio (D)	28
3.8.	Ground Motion.....	28
3.9.	Liquefaction Assessment.....	30
3.9.1.	Liquefaction susceptibility	30
3.9.2.	Liquefaction Potential Analysis	32
3.9.3.	Liquefaction Potential Index (LPI).....	34
3.9.4.	Liquefaction Severity Index (L_s).....	34
3.10.	Microzonation	35
3.10.1.	Microzonation methods	35
3.10.2.	Inverse Distance Weighted (IDW)	36
CHAPTER 4	METHODOLOGY	37
4.1.	Study Area.....	37
4.2.	Data	37
4.3.	Research Procedure	38
CHAPTER 5	ANALYSIS	41
5.1.	Geological Conditions.....	41
5.1.1.	Bantul District	42
5.1.2.	Yogyakarta District.....	43
5.2.	Geotechnical Conditions	44
5.2.1.	Soil stratigraphy.....	44
5.2.2.	Soil classification.....	48
5.3.	Site Response Analyses.....	49



5.3.1.	Target spectrum	49
5.3.2.	Spectral matching	50
5.4.	Liquefaction Assessment.....	52
5.4.1.	Cyclic Stress Ratio (CSR)	52
5.4.2.	Cyclic Resistance Ratio (CRR)	54
5.4.3.	Safety Factor.....	55
5.5.	Liquefaction Hazard Maps	56
5.5.1.	Microzonation of maximum surface acceleration	56
5.5.2.	Microzonation of liquefaction potential and severity index	57
CHAPTER 6	CONCLUSIONS AND RECOMMENDATIONS	60
6.1.	Conclusion.....	60
6.2.	Recommendation.....	61
REFERENCES	62