

LIST OF CONTENTS

TITLE PAGE	i
APROVAL PAGE	ii
PROCESS VERBAUX (BERITA ACARA)	iii
ABSTRACT	iv
ABSTRAK	v
MOTTO	vi
DEDICATION	vii
ACKNOWLEDGEMENT	viii
LIST OF CONTENS	x
LIST OF TABLE	xiv
LIST OF FIGURE	xv
ABREVIATIONS	xvii

CHAPTER I

INRODUCTION	1
1.1. Backround	1
1.2. Floating runway	4
1.3. Problem limitations	4
1.4. Objectives of the study	5
1.5. Scope of the study	5

CHAPTER II

LITERATURE REVIEW	6
2.1. Introduction	6
2.2. Airport	6
2.3. Runway	7
2.4. Types of runway configuration	8
2.4.1. Length of runway	8

2.4.2. Runway configuration	10
2.5. Floating runway	13
2.5.1. HMA surface course.....	14
2.5.2. Concrete slab	16
2.5.3. Beams	19
2.5.4. Pile cap	22
2.5.5. Pile	24
2.6. The force act on the floating runway	26
2.6.1. Wind force	26
2.6.2. Sea wave	29
2.6.3. Earthquake load	32
2.7. Aircraft standard dimension	38
2.8. Aircraft weight	41
2.9. Landing gear configuration	43
2.10. The example of floating runway design and force application	47
2.10.1. Kansai International Airport	47
2.10.2. I Gusti Ngurah Rai International Airport	48
2.11. Summary of literature review.....	48

CHAPTER III

DESIGN AND METHODOLOGY	50
3.1. Introduction	50
3.2. Preliminary design	50
3.3. Determination of high water spiring (HWS)	50
3.4. Overview of floating runway dimensions	54
3.4.1. floating runway lenght	54
3.4.2. Floating Runway width	57
3.4.3. Floating runway elevation.....	58
3.5. Determination of loads	58
3.5.1. Dead Loads.....	58

3.5.2. Life Load	63
3.5.3. Wave Load	69
3.5.4. Load of sea water flow	71
3.5.5. Wind load on the deck slab	72
3.5.6. Earthquake loads	73
3.5.7. Combination loads.....	74
3.6. Overlay Layer of Asphalt	76
3.7. Calculation of deck slab	77
3.7.1. Calculation of reinforcement floating runway	79
3.7.2. Deflection control on deck slab.....	88
3.8. The plan of floating runway beams	96
3.8.1. Determination of equivalent width.....	97
3.8.2. Calculation of reinforcement beams	97
3.8.3. Calculation of slide reinforcement	109
3.9. Calculation of pile cap.....	113
3.10.Calculation of piles.....	121

CHAPTER IV

DESIGN AND CALCULATION	126
4.1. Introduction	126
4.2. Preliminary design	126
4.3. Determination of high water spring (HWS).....	127
4.4. Overview of floating runway dimensions	127
4.4.1. Floating runway length.....	128
4.4.2. Floating runway width	130
4.4.1. Floating runway elevation	133
4.5. Determination of loads	135
4.5.1. Calculation of dead loads	135
4.5.2. Calculation of life loads	141
4.5.3. Calculation of wave loads	145
4.5.4. Calculation of sea water flow	152

4.5.5. Calculation of wind force on deck slab	154
4.5.6. Calculation of earthquake loads	156
4.6. Overlay layer of asphalt	160
4.7. Calculation of concrete deck slab.....	162
4.7.1. Calculation of Reinforcement Floating Runway ...	165
4.8. Deflection control on deck slab.....	192
4.9. Calculation of floating runway beams	200
4.9.1. Determination of equivalent width.....	200
4.9.2. Calculation of beam reinforcement.....	202
4.9.3. Calculation of slide reinforcement	220
4.10. Calculation of pile cap	225
4.11. Calculation of piles	234
CHAPTER V	
CONCLUSIONS AND RECOMMENDATIONS	241
5.1. Conclusions	241
5.2. Recommendations	241
REFERENCES	242
APPENDICS	246-255

LIST OF TABLE

Table 2.1. Runway length.....	9
Table 2.2. Minimum width of runway.....	9
Table 2.3. Classification distance between runway parallel	12
Table 2.4. Soil type based on SNI earthquake 2002	36
Table 2.5. Aircraft weight	43
Table 2.6. The standard naming of the aircraft's confederation.....	45
Table 2.7. Main landing wheel configuration	46
Table 3.1. Makassar sea tidal components.....	52
Table 3.2. Effective grade	56
Table 3.3. Wide runway based on code numbers.....	57
Table 3.4. Technical specifications aircraft boeing B747-400.....	68
Table 3.5. Power reduction factor.....	82
Table 3.6. Constant time dependency factor dead load.....	95
Table 3.7. Table arrangement location of strengthening points.....	106
Table 4.1. Wave height and period of wave plan in the deep sea.....	133
Table 4.2. Thickness of asphalt overlay.....	135
Table 4.3. Dimension of deck slab	136
Table 4.4. Dimension of transverse Beam	137
Table 4.5. Dimension of lengthwise beam.....	137
Table 4.6. Dimension of pilecap	138
Table 4.7. Dimension of pile.....	139
Table 4.8. Calculation equivalent single wheel load (ESWL) value	145
Table 4.9. Drag coefficient	146
Table 4.10. Inertia coefficient.....	148
Table 4.11. Wind speed in Makassar.....	155
Table 4.12. Factors of building excellence	157
Table 4.13. Earthquake reduction factor.....	159
Table 4.14. Calculation of equivalent width.....	201
Table 4.15. Calculation of location of reinforcement point	210
Table 4.16. The coefficient of carrying capacity of the land according to Terzaghi.....	237

LIST OF FIGURE

Figure 1.1. The angel of take-off and landing of the aircraft.....	2
Figure 1.2. Ngurah Rai International Airport's	2
Figure 1.3. Kansai International Airport.....	3
Figure 1.4. Runway over the dike made from the heap of tetrapods	3
Figure 1.5. Floating runway	4
Figure 2.1. Layout of simple airport	7
Figure 2.2. Single runway configuration	10
Figure 2.3. Parallel runway configurations	11
Figure 2.4. Intersection runway configuration	12
Figure 2.5. The openend V runway configuration	13
Figure 2.6. The floating runway parts	14
Figure 2.7. Stress, strain and force that occur in pure reinforced concrete bending planning	20
Figure 2.8. Illustration of single pile cap reinforcement across the pier	24
Figure 2.9. Wind rose diagram	28
Figure 2.10. Waves of beach builders and waves of beach destroyers	30
Figure 2.11. Sketch the definition of force parameters on the pole	32
Figure 2.12. Sketch definition of edge wave style	32
Figure 2.13. Map of earthquake zone of Indonesia	35
Figure 2.14. Spectrum earthquake response for each zone	36
Figure 2.15. Spectrum earthquake response in region 2	38
Figure 2.16. Plane Playing Angle	41
Figure 2.17. Basic landing gear configuration	45
Figure 2.18. Landing gear configuration as Boeing 747, Boeing 777, and Airbus A-380.....	46
Figure 3.2. Curve determines the value of the reduction factor for dual wheel aircraft.....	65
Figure 3.3. Curve determines the value of the reduction factor for tandem dual wheel aircraft	65

Figure 3.4. Boeing B747-400 General aircraft dimension	67
Figure 3.5. Boeing B747-400 Landing gear footprint	68
Figure 3.6. Ultimate moment on the beam.....	101
Figure 4.1. Looks up from the floating runway	131
Figure 4.2. Side view of the floating runway	132
Figure 4.3. Elevation of the floating runway surface	134
Figure 4.4. Acurve determined reduction factor value for dual wheel airplane....	144
Figure 4.5. Wave load at edge floating runway	150
Figure 4.6. Load of sea water flow	152
Figure 4.7. Response spectrum earthquake region 2.....	158
Figure 4.8. Plan of the deck slab of the floating runway	162
Figure 4.9. The loading area on the beam	200
Figure 4.10. Load distribution on beam as B	201

ABBREVIATIONS

ICAO	International Civil Aviation Organization
ARFL	Aeroplane Reference Field Length
IFR	Instrument Flight Rules
VFR	Visual Flight Rules
HMA	Hot Mix Asphalt
CBR	California Bearing Ratio
T/W	Taxiway
OWE	Operating Weight Empty
ZFW	Zero Fuel Weight
MRW	Maximum Ramp Weight
MTOW	Maximum Take-off Weight
MLW	Maximum Landing Weight
MPa	Mega Pascal
FAA	Federal Aviation Administration
T.O.	Take Off
HWS	High Water Spring
MSL	Mean Sea Level
ESWL	Equivalent Single Wheel Load
RF	Reduction Factor
SAS	Scandinavian Airlines System
OCDI	Overseas Coastal Development Institute
MR	Resilient Modulus
psi	pounds per square inch
lbs	pounds
ft	feet
in.	inches