

DETERMINATION OF K and β DURING CONTROLLED BLASTING
FOR KARSTIC LIMESTONE ROCKS AT KLANG VALLEY

NALINII RAVICHANDRAN

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Faculty of Engineering
Universiti Teknologi Malaysia

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DEDICATION

This project report is dedicated to my mother, father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my lecturer IR.Dr.Rini Asnida who taught me that even the largest task can be accomplished if it is done one step at a time.

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ABSTRACT

Ground vibration induced during controlled blasting activity is one of the big concerns especially in highly populated area. Hence, vibration control study plays a vital role in order to reduce the effect to the surrounding. This study involves collection of blasting data from Karstic Limestone formation at Klang Valley in order to establish the relationship between Peak Particle Velocity (PPV) and scaled distance technique. Besides that, this study is also aim to determine the suitable K and β for Karstic Limestone formation at Klang Valley. A statistical conducted in order to study the importance of blasting controllable variables between maximum charge per delay, number of holes, hole depth, powder factor and PPV in Karstic Limestone Formation at Klang Valley by using the United States Bureau of Mines (USBM) equation as basis. Based on the regression analysis conducted, the site constant for Karstic limestone known to be K as 26.74 whereas the B is -0.801. In overall, all the variables like burden, spacing, hole depth, are showing weak linear relationship with correlation in positive values.

ABSTRAK

Getaran bumi yang disebabkan semasa aktiviti letupan terkawal adalah salah satu kebimbangan besar terutama di lokasi yang banyak penduduk. Oleh itu, kajian kawalan getaran memainkan peranan penting untuk mengurangkan kesan ke sekelilingnya. Kajian ini melibatkan pengumpulan data letupan dari pembentukan batu kapur Karstik di Lembah Klang untuk menubuhkan hubungan antara Halaju Zarah Puncak (PPV) dan teknik jarak bersisik. Di samping itu, kajian ini juga bertujuan untuk menentukan K dan β yang sesuai untuk pembentukan Batu Karstik Kapur di Lembah Klang. Satu analisis statistik akan dijalankan untuk mengkaji kepentingan pembolehubah yang dapat dikawal dengan pengecasan antara caj maksimum setiap kelewatan, bilangan lubang, kedalaman lubang, faktor serbuk dan PPV dalam Formasi Batu Kapur Karstic di Lembah Klang dengan menggunakan Biro Pertambangan Amerika Syarikat (USBM persamaan sebagai asas. Berdasarkan analisis regresi yang dilakukan, pemetaan tapak untuk batu kapur Karstic dikenal sebagai K sebagai 26.74 manakala B adalah -0.801. Keseluruhannya, semua pembolehubah seperti beban, jarak, kedalaman lubang, menunjukkan hubungan linear lemah dengan korelasi dalam nilai positif.

TABLE OF CONTENTS

	TITLE	PAGE
	DECLARATION	iii
	DEDICATION	iv
	ACKNOWLEDGEMENT	v
	ABSTRACT	vi
	ABSTRAK	vii
	TABLE OF CONTENTS	viii
	LIST OF TABLES	x
	LIST OF FIGURES	xi
	LIST OF ABBREVIATIONS	xiii
	LIST OF SYMBOLS	xiv
	LIST OF APPENDICES	xv
CHAPTER 1	INTRODUCTION	1
1.1	Problem Statement	1
1.2	Research Objectives	2
1.3	Scope of Study	2
CHAPTER 2	LITERATURE REVIEW	3
2.1	Karstic Limestone at Klang Valley	3
2.2	Controlled Basting	6
2.3	Mechanism of ground vibration	7
2.4	Rock Breaking Mechanism	9
2.5	The effect of rock mass characteristics on blasting	10
2.5.1	Rock Strength	10
2.6	Rock density and porosity	11
2.7	Structural discontinuities of the rock	11
2.8	Ground Water	12
2.9	Rock blasting geometry	13

2.10	Blast Holes	13
	2.10.1 Blast hole Inclination	13
2.11	Bench Height	14
2.12	Burden	16
2.13	Spacing	17
2.14	Subgrade Drilling/Sub drilling	17
2.15	Stemming	18
2.16	Initiation sequence and delay timing	19
2.17	Blast Induced Ground Vibration	20
	2.17.1 Frequency	21
	2.17.2 Body Waves	22
	2.17.3 Surface Waves	22
2.18	Vibrometer	23
2.19	Ground Vibration controllable variables.	24
2.20	Peak Particle Velocity (PPV) Predictors	24
2.21	Scaled Distance	27
2.22	Regression Analysis	28
	2.22.1 Coefficient of determination R^2	29
CHAPTER 3	RESEARCH METHODOLOGY	31
3.1	Introduction	31
3.2	Methodology	31
CHAPTER 4	TENTATIVE RESEARCH SCHEDULE	41
CHAPTER 5	PROPOSED WORK	43
5.1	Blasting measurement result	43
CHAPTER 6	CONCLUSION AND RECOMMENDATIONS	55
6.1	Research Outcomes	55
6.2	Future Works	55
	REFERENCES	57

LIST OF TABLES

TABLE NO.	TITLE	PAGE
Table 2.1	Blast evaluation for different combinations of hole diameter and bench height (Adhikari, 2005)	15
Table 2.2	Global survey of blasthole diameter and bench height(Rijalba, 2015)	16
Table 2.3	Optimal spacing to burden ratio according to model and half scale blasts(Adhikari, 2005)	17
Table 2.4	Recommended stemming length for surface mines (Engin, 2009)	19
Table 2.5	PPV Predictor equation from different researchers	27
Table 3.1	Blasting Parameter Range used for the Blasting operation	36
Table 5.1	Constant comparison between Standard Association of Australia and Actual Blasting Data	45
Table 5.2	Correlation Summary Table	52

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
Figure 2.1	Kenny Hill Limestone(Tan Siow Meng)	4
Figure 2.2	Limestone Karst Category(Waltham & Fookes, 2005)	4
Figure 2.3	Process of limestone dissolution (Tan Siow Meng)	5
Figure 2.4	Kuala Lumpur Geological Map(Tan Siow Meng)	5
Figure 2.5	Ground Vibration Mechanism	6
Figure 2.6	Detonation Progression(Roy, 2005)	7
Figure 2.7	Shock Wave Propagation(Shi & Chen, 2011)	8
Figure 2.8	Explosion Energy Summary	9
Figure 2.9	Strength of Rocks (Ranjan Kumar, 2005)	10
Figure 2.10	Comparison of Blast performance with the density of the rock.(Noorani, 2013)	11
Figure 2.11	the effects of jointing on selection of blast hole size(Nguyen, 2018)	14
Figure 2.12	Blasting Parameters(Monjezi & Dehghani, 2008)	15
Figure 2.13	Blasting pattern (Engin,2009)	20
Figure 2.14	Different Wave direction in blasting	23
Figure 2.15	Sample of Correlation graph produced using USBM equation.(Cormie, Willkinson, Shin, & Whittaker, 2013; N. Kingery & F. Pannill, 1964)	28
Figure 2.16	Sample Graph between PPV and square-root-scaled distance on log–log scale to obtain the K and B constant. (Cormie, Willkinson, Shin, & Whittaker, 2013; N. Kingery & F. Pannill, 1964)	28
Figure 3.1	Blasting Sequences	32
Figure 3.2	Blasting Covering Sequence	33
Figure 3.3	Vibrometer Location	34
Figure 3.4	Mucking Work after blasting	35
Figure 3.5	Typical Blasting Pattern	35

Figure 3.6	Location of Blasting Operation(Tan Siow Meng)	36
Figure 3.7	Blasting Parameters used for the Analysis	37
Figure 3.8	Blasting covering work	38
Figure 3.9	Influential parameters on fly rock and ground vibration in blasting operation	38
Figure 3.10	Project Flowchart	39
Figure 5.1	Blasting Data Captured from the Vibrometer	44
Figure 5.2	Site Investigation data from Blasting Location	46
Figure 5.3	Actual PPV vs Scaled Distance	46
Figure 5.4	Peak Particle Velocity (PPV) (mm/sec) vs Maximum Charge per Delay (kg)	47
Figure 5.5	Blasting Depth (M) vs Actual Peak Particle Velocity (mm/sec)	47
Figure 5.6	Peak Particle Velocity PPV mm/sec vs Blasting Parameters	50

LIST OF ABBREVIATIONS

PPV	-	Peak Particle Velocity
USBM	-	United States Bureau of Mines

LIST OF SYMBOLS

δ	-	Minimal error
D, d	-	Diameter
β	-	Site Constant
v	-	Velocity
$-k$	-	Site constant

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
Appendix A	Full Blasting Analysis Summary	61
Appendix B	Rock Sample from Blasting location	69
Appendix C	Blasted Area	70
Appendix D	Blasting Covering	70
Appendix E	Drilling for Blasting Work	71
Appendix F	Blasting hole Cleaning Works	72
Appendix G	Blasting Hole Drilling Work	72
Appendix H	Drilling for Blasting	73
Appendix I	Blasting Hole drilling work	73
Appendix J	Blasting hole cleaning work	74

CHAPTER 1

INTRODUCTION

1.1 Problem Statement

Blasting activity is dangerous and in some situation can cause disturbance to the public in surrounding. This is because the shock wave travelled in a form of energy through the ground can cause damage to the nearby properties. Beside that flying rocks, and air blast extremely dangerous for the public safety and also the nearby structures. The prediction of Peak Particle Velocity is vital to secure the safety of the surrounding people and also to shield the surround buildings. As per current practice, the blasting designer use the site distance, k and β values as 1140 and -1.6 for all blasting operation regardless of the rock type.

These values are taken from Australian Standard AS2187.2-1993, where the standard was developed based on Scaled Distance Chart in Australia and no such study has been done for Malaysia ground conditions. (Tan Siow Meng) explained that currently, the predicted peak particle velocity data shows higher reading as compared to measured reading which raised doubt on the accuracy and suitability in using the data from Australian Standard. This may lead to blasting designer to reduce the explosive amount to suit the PPV desired for the any particular controlled blasting work. (Manoj Khandelwal).

1.2 Research Objectives

The main objective of the study are as follows:

- a. To determine the suitable site constant, K and β value to be used in square root scaled distance equation for Karstic limestone in Klang Valley.
- b. To establish the relationship in a table form between hole numbers, maximum charge per delay, hole depth, powder factor and PPV from Karstic Limestone formation at Klang Valley.

1.3 Scope of Study

The scope of this project is limited to the following constrain:

- i. Controlled blast operation for Karstic Limestone formation Klang Valley.
- ii. The K and β constant will be obtained by using the scaled distance method from United States Bureau of Mines (USBM) equation.

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