

**MALAYSIAN SOCIO-TECHNICAL DISASTER MODEL
AND LEARNING SYSTEM**

AINI MAT SAID

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DEDICATION

To my beloved

Husband: Fakhru'l-Razi Ahmadun

Late Parents: Meriam Abdullah dan Mat Said bin Hj. Abdul Latif

And Children: Muhamad Soffee-Ullah, Asiyah Hananah, Maryam Nahdiyah
Khadijah Najwa, Fatimah Zahrah, Abu Bakr As-Siddiq and
Umar Al-Faruq.

Abstract of thesis presented to the Senate of Universiti Putra
Malaysia in
fulfilment of the requirement for the degree of Doctor of
Philosophy

**DEVELOPMENT AND APPLICATION OF A
MALAYSIAN
SOCIO-TECHNICAL DISASTER MODEL**

By

AINI MAT SAID

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Chairman: Professor Mohamed Daud, PhD

Faculty: Engineering

Understanding of the development and causes of the disasters provides a tool for organizational and institutional diagnosis of vulnerability and risks. The hindsight gained from these negative events could be utilized by government and enterprises to design organizational structures that will help reduce the likelihood of disaster as the nation progresses. A multi strategy research was designed utilizing qualitative and quantitative approach to develop a socio-technical disaster model and a learning system for Malaysia. Using a grounded theory approach, six inquiry reports were used to identify the phases associated with the development of the socio-technical disasters and their underlying causes. Management of the inquiry into these disasters and the recommendations made by the tribunal of inquiry were also analyzed. Nvivo

software program was utilized to model the latent errors attributed to the disasters. A survey was conducted among Malaysian Disaster experts who were selected using judgmental sampling in order to determine their views on disaster and disaster inquiry management. Data obtained from both qualitative and quantitative study was then transferred into a Visual Basic 6.0 computer program to form a learning and advice model.

Despite the differences of disasters involved and their technologies, the disasters were found to exhibit common features and characteristics. The findings demonstrated that socio-technical disasters are not sudden cataclysmic events but they evolved in phases with long developmental period. Underlying causes of the disasters are found to be due to latent errors that are accumulated and get embedded in the system during the incubation period. Inside the organization, a complex set of managerial, procedural, training, safety and failure to learn factors interact with external factors of regulatory and human failures to produce the disasters.

The experts were found to have only fair perception towards the management of Public and Royal inquiries into disasters in the country. They were least satisfied with recommendations and learning aspect of the inquiry. This commensurate with

the overall perception of the experts that the management of the disaster inquiry should be improved in order to increase learning from them. It was suggested that a flexible guideline should be developed so that it is not entirely left to the personal style of the chairman as currently practiced.

The data obtained from the study was further utilized to develop an advice and learning model for public access through an application of an expert system. This is a useful tool for teaching at higher institutions; media of instructions for training institutions and industries; and e- learning for professional development.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PEMBENTUKAN DAN APLIKASI MODEL BENCANA SOSIO-TEKNIKAL DI MALAYSIA

Oleh

AINI MAT SAID

Februari 2006

Pengerusi: Profesor Mohamed bin Daud, PhD

Fakulti: Kejuruteraan

Memahami bagaimana sesuatu bencana berlaku dan apakah
punca ianya terjadi akan menjadi satu pedoman untuk
organisasi dan institusi untuk mengenalpasti keperluan dan

risiko yang dihadapinya. Pengajaran yang didapati dari tinjauan kembali tragedi-tragedi yang telah berlaku boleh digunakan oleh kerajaan dan pengusaha untuk merancang dan melaksanakan struktur-struktur bagi mengurangkan risiko bencana sejajar dengan pembangunan negara. Satu kajian pelbagai strategi dengan menggunakan pendekatan kajian kualitatif dan kuantitatif telah digunakan untuk membentuk satu model dan sistem pembelajaran bencana socio-teknikal di Malaysia. Dengan menggunakan kaedah ‘grounded’ teori, enam laporan bencana telah digunakan untuk mengenalpasti fasa dan punca utama kejadian bencana. Analisis juga dilakukan terhadap pengurusan penyiasatan dan cadangan yang dibuat oleh tribunal penyiasatan. Program komputer ‘Nvivo’ telah digunakan untuk melakarkan model kesilapan terpendam untuk setiap bencana. Satu tinjauan juga telah dijalankan keatas pakar-pakar bencana di Malaysia dengan menggunakan kaedah persampelan ‘judgmental’ untuk mengenalpasti pandangan mereka terhadap bencana dan pengurusan bencana. Data yang diperolehi dari kedua-dua keadah kualitatif dan kuantitatif

kemudiannya dipindahkan ke komputer program ‘Visual Basic’
untuk dijadikan model pembelajaran dan penasihatan.

Walaupun bencana-bencana itu berbeza dari aspek teknologinya , mereka didapati mempamerkan sifat dan ciri-ciri yang sama. Dapatan kajian menunjukkan bahawa bencana socio-teknikal tidak berlaku dengan secara tiba-tiba tetapi mengambil masa yang lama dan beransur-ansur berkembang melalui fasa-fasa tertentu. Punca utama bencana didapati disebabkan oleh kesilapan terpendam yang berkumpul dan tertanam dalam sistem pada fasa inkubasi. Dalam organisasi, factor-faktor pengurusan, prosidur, latihan, keselamatan dan kegagalan untuk belajar telah berinteraksi dengan faktor luaran seperti kelemahan perundangan dan kesilapan manusia telah mencetus bencana-bencana tersebut. Pakar-pakar bencana didapati hanya mempunyai persepsi yang sederhana terhadap kedua-dua pengurusan penyiasatan bencana iaitu penyiasatan Awam dan Diraja. Mereka paling tidak berpuas hati dengan aspek rekomendasi dan pembelajaran dari penyiasatan. Ini selari dengan persepsi menyeluruh terhadap pengurusan penyiasatan bencana dimana mereka merasakan pembaikan perlu dibuat untuk mengambil pengajaran dari bencana-bencana. Mereka telah mengutarakan supaya satu panduan yang anjal dibentuk supaya kaedah dan cara pengurusan penyiasatan tidak sepenuhnya terletak ditangan pengerusi penyiasat sebagaimana yang berlaku sekarang ini.

Data yang didapati dari kajian ini seterusnya digunakan untuk membentuk satu model pembelajaran dan penasihatan untuk kegunaan umum melalui aplikasi sistem pakar. Kedua-duanya

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“God grants wisdom unto whom He wills, and whosoever is granted wisdom has been granted wealth abundant. But none bears this in mind save those who are endowed with insight. “

Al-Baqarah: 269

This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee are as follows:

Mohamed Daud, Ph.D.

Professor
Faculty of Engineering
Universiti Putra Malaysia
(Chairman)

Normariah Adam, Ph.D.

Associate Professor
Faculty of Engineering
Universiti Putra Malaysia
(Member)

Razali Abdul Kadir, Ph.D.

Associate Professor
Faculty of Engineering
Universiti Putra Malaysia
(Member)

AINI IDERIS, Ph.D.
Professor/Dean
of Graduate School
Universiti Putra Malaysia

Date:

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted to any other degree at UPM or other institutions.

AINI MAT SAID

Date: 7 February 2006

TABLE OF CONTENTS

	Page
DEDICATION	
ii ABSTRACT	
	iii
ABSTRAK	vi
ACKNOWLEDGEMENTS	vii
APPROVAL	
viii	
DECLARATION	xv
LIST OF TABLES	xx
LIST OF FIGURES	
xxii	
LIST OF ABBREVIATIONS	
CHAPTER	
1 INTRODUCTION	
1.1 The Problem and Its Context	1
1.2 Statement of Problem	7
1.3 Justification of the study	9
1.4 Objectives of the Study	10
1.5 Significance of the Study	11
1.6 Limitations of the study	12
1.7 Definitions of Terms	12
2 LITERATURE REVIEW	
2.1 Introduction	
2.1.1 Overview of Past Disasters in Malaysia	14
2.1.2 National Disaster management	24
2.1.3 Land Disaster Management and Relief Policy (Directive 20)	28
2.1.4 Issues and Challenges	30
2.1.5 Summary	36
2.2 Concept and Taxonomy of Disaster	
2.2.1 Study of Disasters	37
2.2.2 Definition of Disasters	43
2.2.3 Classification of Disaster	55
2.2.4 Natural Versus Man-made disasters	58
	xii

2.2.5	Future Disasters	61
2.2.6	Summary	67
2.3	Disaster Theory and Models	
2.3.1	Developmental Theory	69
2.3.2	Normal accident Theory	82
2.3.3	High Reliability Theory	82
2.3.4	Summary	83
2.4	Errors in Disasters	
2.4.1	Perspectives in the Study of Error	84
2.4.2	Error Models	88
2.4.3	Types of Error	96
2.4.4	Summary	101
2.5	Learning from Disasters	
2.4.1	Lessons from past Disasters	105
2.4.2	Disaster learning Models	109
2.4.3	Summary	113
2.6	Disaster Inquiry	
2.6.1	Types of Disaster Inquiry	115
2.6.2	Function and Features of Inquiry	118
2.6.3	Issues	128
2.6.4	Summary	135
2.7	Expert System	
2.7.1	Introduction	138
2.7.2	Structure of Expert System	140
2.7.3	Tools for Expert System	141
2.7.4	Application of Expert System in Disaster Management	142
2.7.5	Summary	145
3	METHODOLOGY	
3.1	Introduction	
146	3.2 Qualitative Research Design	148
	3.2.1 Data Collection	150
	3.2.2 Data Analysis	154
	3.2.3 Nvivo Software	159
3.3	Quantitative Research Strategy	161
	3.2.1 Theoretical and Research Framework	161
	3.2.2 Instrumentation	164
	3.2.3 Pre-Testing of Instrument	165
	3.2.4 Population and Sampling	171
	3.2.5 Data Collection	173
	3.2.6 Data Analysis	174
3.4	Development of Socio-Technical Disaster Learning and Advise Model	176
4	FINDINGS AND DISCUSSION	
4.1	Analysis of the Development and Management of the	

	Ensuing Inquiry of the Socio-Technical Disasters	
4.1.1	Collapse of a Four-story Building on Lot No. 503, Jalan Raja Laut, Kuala Lumpur on 19 October 1968.	178
4.1.2	Collapse of Part of the Platform of the Passenger Waiting Area of the Sultan Abdul Halim Ferry Terminal at Butterworth on 31 July 1988.	198
4.1.3	Fire at Sekolah Agama Rakyat Taufiqiah Khairiah Al Halimiah, Padang Lumat, Yan Kedah on 22 September 1989.	216
4.1.4	The Fire and Explosions at Bright Sparklers Sdn. Bhd Factory On 7 May 1991.	243
4.1.5	The Fire and Explosions at Port Kelang on 20 June 1992.	270
4.1.6	The Collapse of Block 1 and the Stability of Block 2 and 3 of Highland Towers Condominium, Hulu Kelang on December 1993.	292
4.2	Stages of Development of Socio-technical Disasters in Malaysia	
4.2.1	Pre-Disaster Period	317
4.2.2	Disaster Period	323
4.2.3	Post- Disaster Period	332
4.2.4	Phases of Development of Socio-Technical Disasters	376
4.3	Causes of Socio-Technical Disasters	
4.3.1	Active Errors	378
4.3.2	Latent Errors	381
4.4	Analysis of Recommendations Made by the Tribunals of Inquiry	399
4.5	Experts' Views on Disaster and Management of Socio-Technical Disaster Inquiries.	
4.5.1	Profile of Respondents	404
4.5.2	Experience in safety/Disaster Management	410
4.5.3	Criteria for on-land socio-Technical Disaster to be Labeled a Disaster	417
4.5.4	Determination of the Type of Inquiry Following a Disaster	426
4.5.5	Members of Inquiry Committee for Public and Royal Inquiry	435
4.5.6	Number of Inquiry Committee for Public and Royal Inquiry	440
4.5.7	Caliber of Inquiry Committee Members	442
4.5.8	Reporting and Learning from Inquiry	445
4.5.9	Perception of Experts on Management of Public and Royal Inquiries into Disasters in Malaysia	455
4.5.10	Overall Perception of Experts on Disaster Inquiries In Malaysia	463
4.5.11	Areas of Improvements for Disaster Inquiries in Malaysia	464
4.6	Learning and Advise Model of Socio-Technical Disaster	
4.6.1	LAMSTD	468
4.6.2	Updating and Modification of LAMSTD	475

5	DEVELOPMENT OF SOCIO-TECHNICAL DISASTER MODEL	
5.1	Introduction	477
5.2	Socio-Technical Disaster Model	477
5.3	Inquiry Management and Learning System	480
6	CONCLUSION AND RECOMMENDATION	
6.1	Introduction	489
6.2	Conclusion	
	6.2.1 The development and Ensuing Inquiry of the Socio-Technical Disasters	489
	6.2.2 Stages of Development of the Socio-Technical Disasters	490
	6.2.3 Causes of the Socio-Technical Disasters	493
	6.2.4 Learning and Advice Model of Socio-technical Disasters	498
6.3	Implications and Recommendations	498
6.4	Recommendations for Future Research	500

REFERENCES

501 APPENDICES

BIODATA OF THE AUTHOR