

1.0 INTRODUCTION

This is a report prepared by **Mega Jati Sdn Bhd (MJCSB)** which conducted ***KAJIAN PENGGUNAAN ALAT PENANGKAP KILAT DI BANGUNAN-BANGUNAN DI MALAYSIA*** for Jabatan Kawal Selia Keselamatan Elektrik, Energy Commission of Malaysia in year 2016.



Prepared By



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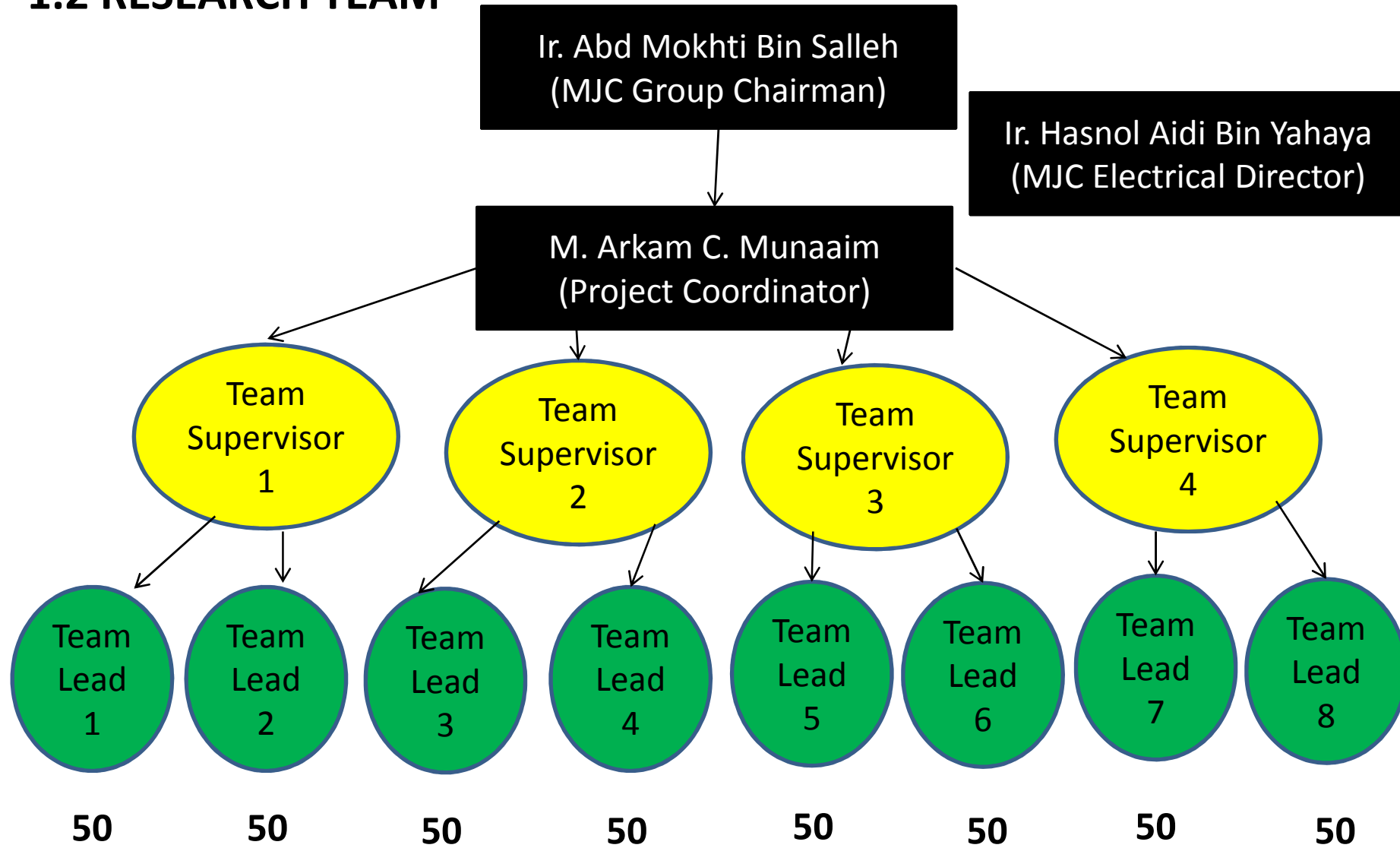
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1.1 PROJECT INFORMATION

ACTIVITIES / ITEM	DATE
Letter of Intend	4 th May 2016
Kick off meeting	1 st June 2016
Inception report submitted to ST	15 TH June 2016 / 19 th June 2016 (Revised)
Approval of Inception Report by ST	Presentation on 29 th July 2016
1 st Progress Report	31 st July 2016
2 nd Progress Report	15 th September 2016
10 copies Final Report (First Draft)	30 th September 2016
Presentation to BOD for approval	10 th October 2016-Correction Required
Correction on Final Draft	10 th October 2016 – 23 rd October 2017
Resubmission of Final Draft for BOD	10 th November 2017
Presentation to BOD for approval	8 th December 2017-Approved
Final Presentation	13 th February 2018

1.2 RESEARCH TEAM



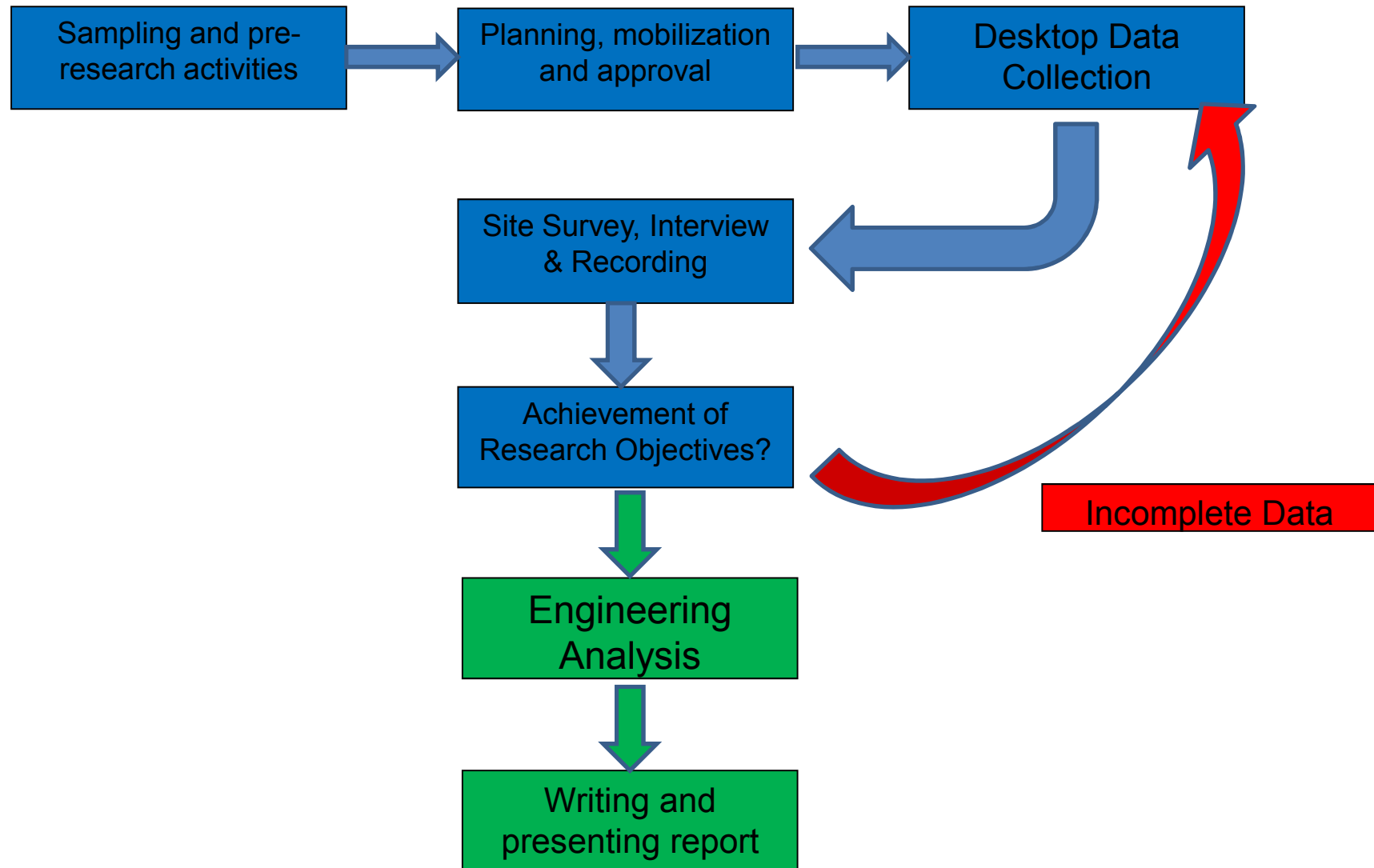
2.0 RESEARCH ACTIVITIES

Preliminary or Walk-through Research

- ✓ Quick assessment of building LPS systems, existing condition, visual check and physical design.
- ✓ Face to face interview and questionnaire with the building owner, operators or maintenance team. The objective will be on investigating the LPS condition, standard compliance towards MS IEC 62305 (2007) part 1-4.
- ✓ Determine on the current LPS installation method, i.e. early streamer emission (ESE), Franklin Rod or Charge Transfer System (CTS).
- ✓ Investigate the effectiveness of the LPS installed and data observation against defects or damage due to lightning.
- ✓ Check on the compliance of the LPS components, i.e. Air terminal, down conductor, earth rod and grounding against MS IEC 62305 (2007) standard.
- ✓ Identify the awareness level of the building occupants towards the importance of LPS in protecting their lives and equipment.

[Reflected TOR](#)

4.0 WORK PLAN SCHEDULE



3.0 REFERENCES

ST's LPS Study Terms and References
MS IEC 60364
MS IEC 62305
MS IEC 61643,
Seksyen 47, Akta Bekalan Elektrik 1990
Peraturan-Peraturan Elektrik 1994

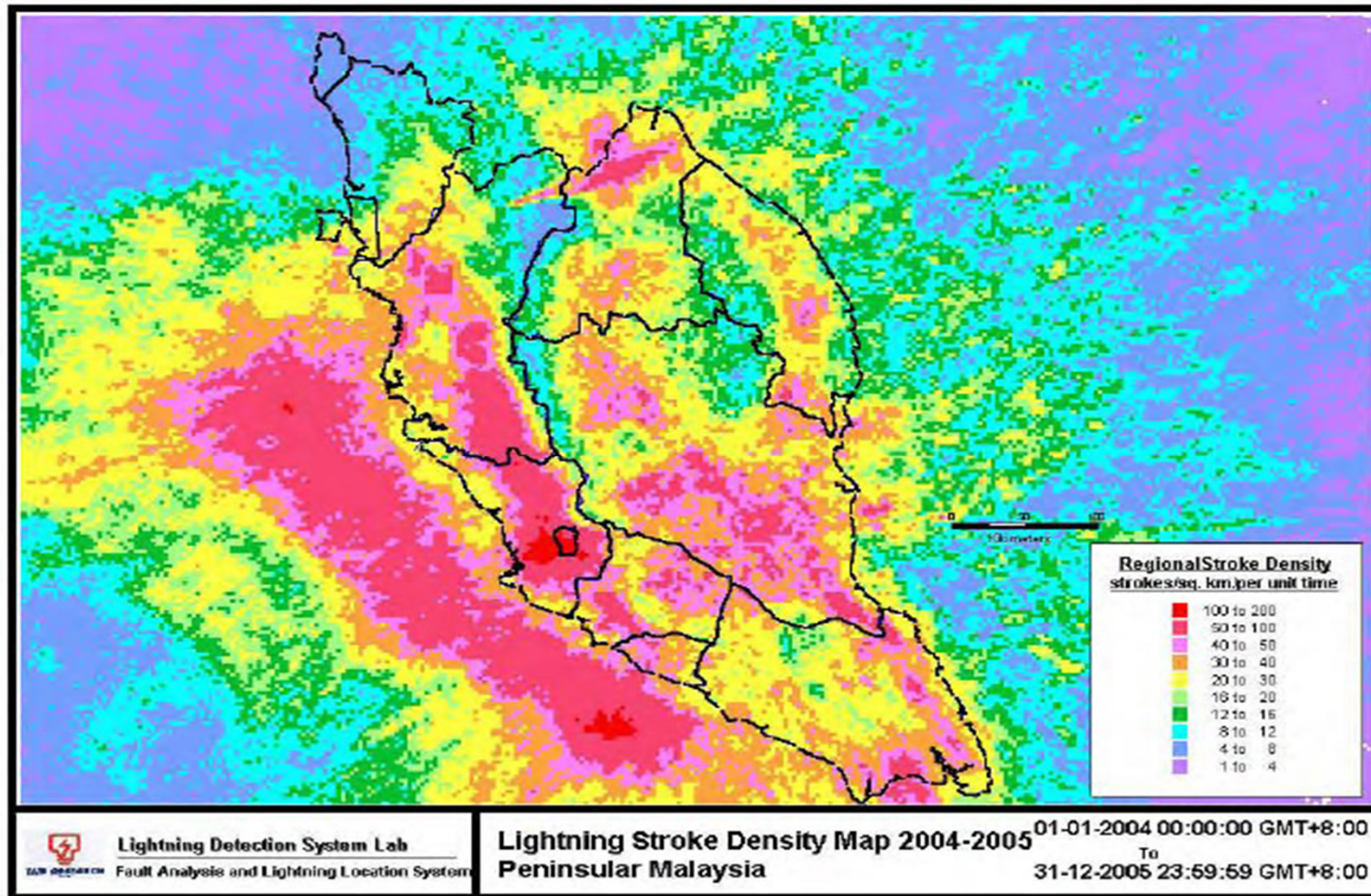
5.0 Main Activities

DURATION	WEEKS															
Activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Sampling and pre-research activities	■	■														
Planning, mobilization building approval application	■	■	■	■	■											
Desktop Data Collection	■	■	■	■	■	■										
Site Survey, Interview & Recording		■	■	■	■	■	■	■	■							
Engineering Analysis										■	■	■	■	■	■	
Final Report															■	■

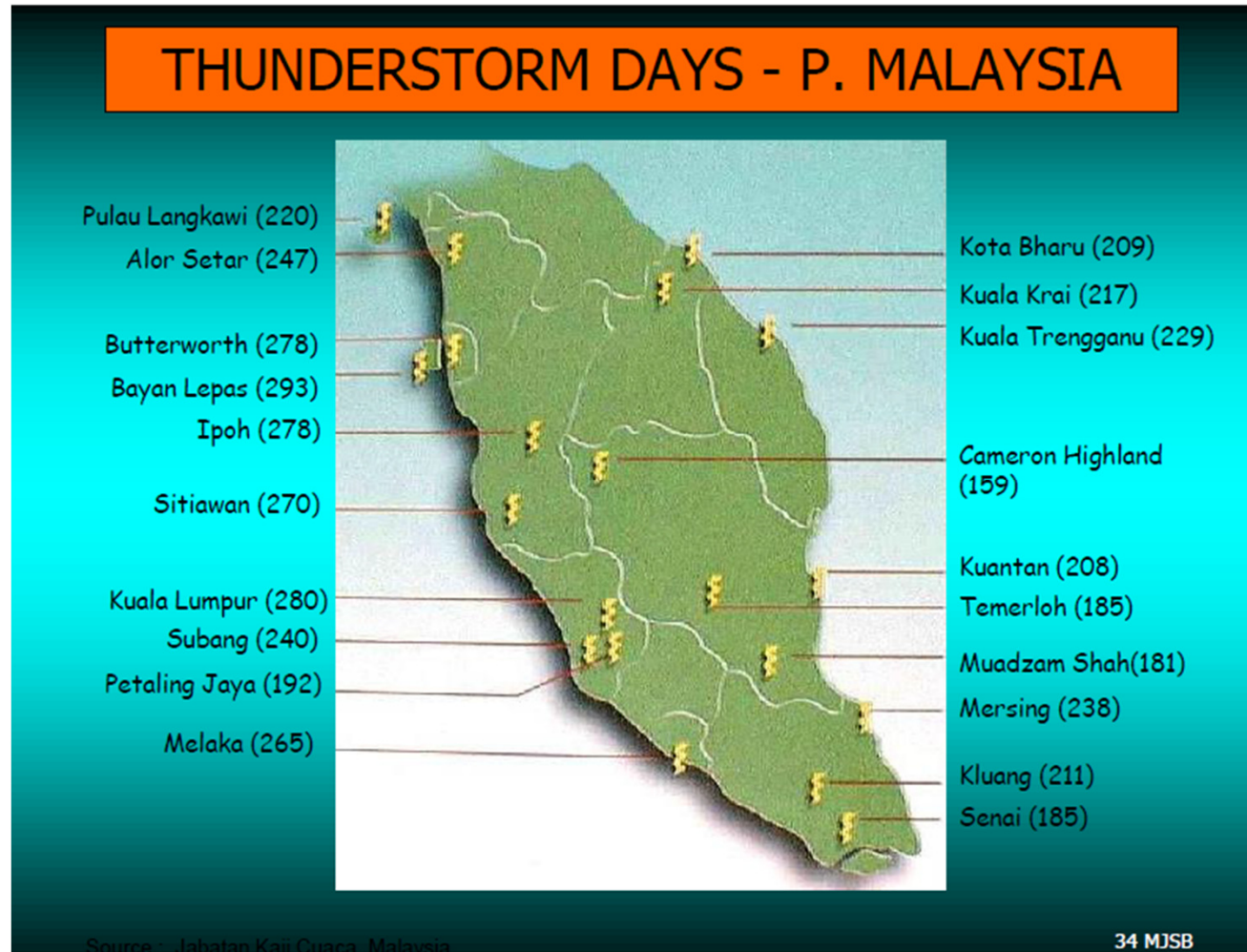
5.1 SAMPLING METHOD

Clustering the location using lightning data for peninsular Malaysia as of to obtain the frequency of occurrence (which is available, not necessary latest-MJC has requested to ST to assist on having the latest Lightning data from TNB and Meteorological Station of Malaysia). The frequency of occurrence will become justified to indicate the percentage of sampling required for the questionnaire distribution.

Confirming on the building categories to represent the actual and established standard of building categories as applied in Malaysia's construction/building industry.



*Fig 1: Lightning Stroke Density Map 2004-2005,
Source: TNB (2005)*



*Fig 2: Thunderstorm Days for Peninsular,
Source: Meteorological Department (2005)*

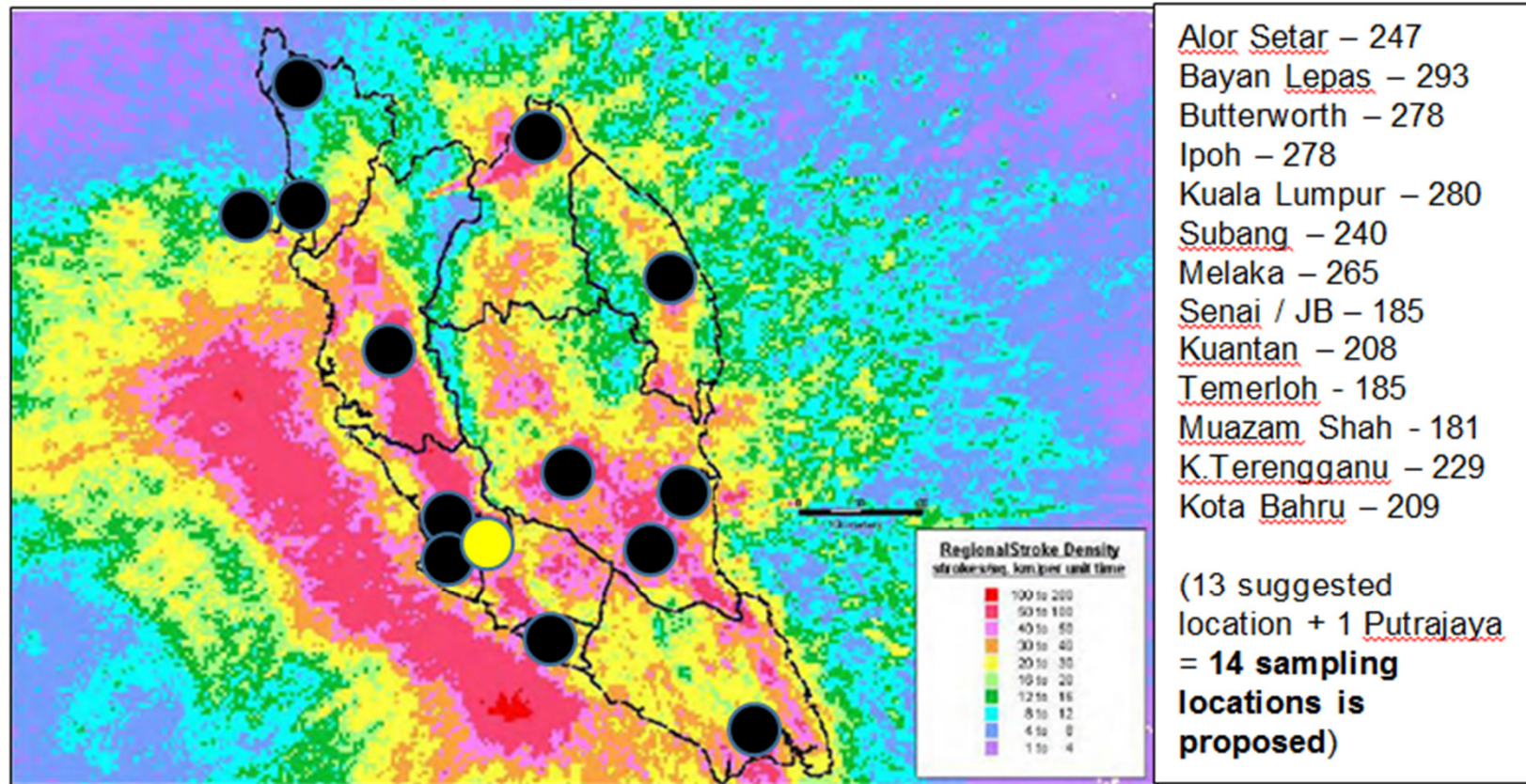


Fig 3: Recommended Sampling Location adopted in this Survey (Dotted)



Components	Category A (Landed housing)	Category B (Stratified housing)	Category C (Public building)	Category D (Special public building)
Structural works	25 %	30 %	30 %	30 %
Architectural works	60 %	50 %	45%	35 %
M & E works	5 %	10 %	15 %	25 %
External works	10%	10 %	10 %	10 %
Total score	100 %	100 %	100 %	100 %

Fig 4: Recommended building type categories (Source: CIDB, 2006)

It is adopted by CIDB in QLASSIC that the building categories as follows:

Building Categories	Type of Building(s)
Category A (Landed Housing)	Detached, Semi-Detached, Terrace and Cluster House.
Category B (Stratified Housing)	Flat, Apartment, Condominium, Service Apartment and Town House.
Category C (Public Building)	Office Building, Schools and other related facilities / buildings built intended for public use.
Category D (Special Public Building)	Hospitals and Airports only.

Fig 5: Building type categories (Source: CIDB, 2006)

Hence, for building categorizations sampling, it is suggested that the recommended building sampling for the survey as follows:

NO	ORIGINAL BUILDINGS (FROM TOR)	RECOMMENDED BUILDINGS (as of QCLASSIC CIDB document)	<u>Number of Sample</u>
1	<u>Bangunan Pejabat</u>	<u>Rumah Kediaman/Bungalow/Teres</u>	50
2	<u>Bangunan Komersil</u>	<u>Rumah Pangsa & Kondominium</u>	50
3	<u>Kondominium</u>	<u>Bangunan Pejabat & Pejabat Kerajaan</u>	60
4	<u>Pejabat Kerajaan</u>	<u>Sekolah / IPT</u>	65
5	<u>Hospital</u>	<u>Kompleks Perniagaan</u>	75
6	<u>Sekolah / IPT</u>	<u>Kilang / Bangunan Perusahaan</u>	75
7	<u>Rumah Kediaman/Bungalow/Teres</u>	<u>Hospital</u>	15 (20)*
8	<u>Rumah Pangsa</u>	<u>Lapangan Terbang</u>	10 (5)*

*Fig 6: Recommended building sampling in this survey
Alternative sampling number

6) Knowledge Transfer Program

In addition, 1 day seminar for ST's Personnel will be conducted after completion of research covering below topic/subtopics for knowledge transfer program from the Researchers to the Commission.

Time	Topic	Speaker
9:00 am- 10:30am	Research Methodology on ST's <u>Kajian Penggunaan Penangkap Kilat di Bangunan-Bangunan di Malaysia.</u>	<u>Ir Hasnol Aidi Bin Yahya</u> , MJC Director
11:00 am- 12:30pm	Introduction to Lightning Protection System, Surge and Electrical Grounding in Building According to of MS IEC 60364, MS IEC 62305, MS IEC 61643, <u>Seksyen 47, Akta Bekalan Elektrik 1990 and Peraturan-Peraturan Elektrik 1994.</u>	<u>Ir. Hj. Abd Mokhti Bin Salleh</u> , MJC Group Chairman, Visiting Professor for School of Electrical System Engineering, <u>Universiti Malaysia Perlis.</u>
2:15 pm- 3:45 pm	Electrical Equipment Grounding and Surge Protection System: Method and Design.	
4:00 pm – 5:30pm	Lightning Protection and <u>Earthing</u> System: Design and application towards good engineering practice.	

7.0 QUESTIONNAIRE

SOAL SELIDIK PENYELIDIKAN

Soal selidik ini adalah mengenai **KAJIAN PENGGUNAAN ALAT PENANGKAP KILAT (LPS) DI BANGUNAN-BANGUNAN DI MALAYSIA**. Masa yang diperlukan hanya anggaran 10 minit untuk menjawab semua soalan. Segala maklumat peribadi tidak diperlukan. Kerjasama tuan puan amatlah dihargai dan diucapkan terima kasih.

Sila tandakan ✓ pada pilihan jawapan anda. Potong mana-mana yang tidak berkenaan.

BAHAGIAN A: MAKLUMAT RESPONDEN DAN BANGUNAN KAJIAN

Bahagian ini adalah untuk mengetahui mengenai latar belakang responden, bangunan kajian dan sejarah bangunan.

1. Nama Bangunan/Kawasan Kajian

8.0 CONCLUSION

Sampling method was done by clustering and confirming the location based on the lightning activity occurrence and building type.

Then the building were selected by random walk-in to the premise according to places that been identified.

Face to face interview and site observation were done to collect respondent's feedback based on the designed questionnaire.

The results is discussed in the next slide.

Thank You.



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