

KOLOKIU PENYELIDIKAN 2021
INSTITUT TADBIRAN AWAM MALAYSIA

DEVELOPING A BUILDING DETERIORATION PREDICTION MODEL (BDPM) FOR PUBLIC SCHOOLS IN PENINSULAR MALAYSIA

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CONTENT

- 01** Research Background
- 02** Problem Statement
- 03** School Scenario
- 04** Aims and Objectives
- 05** Theoretical Framework
- 06** Research Methodology
- 07** Summary Results Finding
- 08** The Importance
- 09** Power Source & Tools
- 10** Way Forward

RESEARCH BACKGROUND

Situation

- Defects in building and deterioration of buildings (Mydin, 2012; Ramly, 2004).

Complication

- Defects caused serious deterioration, danger and failure of the building (Khan, 2016; Hamzah, 2010)

Implication

- Increase in maintenance cost
- Shorten the building lifespan
- Depreciation of building
- Affected occupant / user safety and comfort
- Increase stress level, health impact and low productivity (Clare, 2015)

01

The practice of asset management in Malaysia **was lacking on performance monitoring** (Yusof 2013; Isa, 2002).

STATEMENT 1.0

02

The practice **adopted a reactive maintenance, ad hoc without systematic plan and schedule** (Che-Ani et al, 2015; Mohamed Abu Backer, and Wan Yusoff, 2014).

STATEMENT 2.0

03

Poor in managing the assets will lead to building defects (Hong, 2008)

STATEMENT 3.0

04

The building defects can **caused lower asset life, incur high maintenance cost, reducing the quality of services** (Baum, 2000)

STATEMENT 4.0

PROBLEM STATEMENTS

SCHOOL BUILDINGS SCENARIO

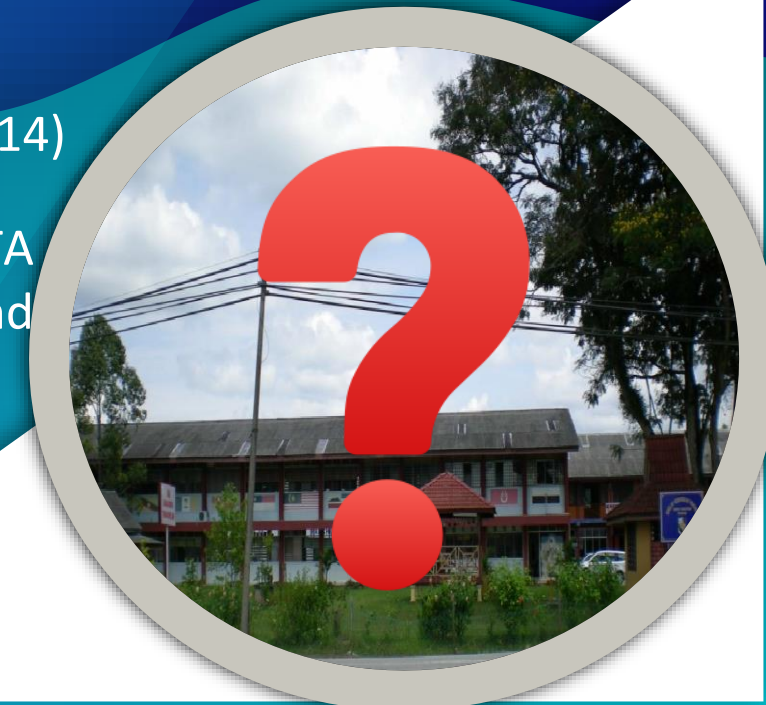
Categories of Public Primary Schools	No. Of Schools	Student Enrolment
Primary School	7,772	2,685,403
Secondary School	2,408	2,188,525
Total	10,180	4,873,920

Source: EMIS Data as 31 July 2016 and APDM Data as 31 May 2016

Largest Infrastructure
and were built more
than

45 Years old

- Exposed to building defects and physically affect the building (Mydin et. al 2014)
- The School building was audited and reported in poor condition (MySPATA report, 2011; Ali, 2013; Yong, 2015; IKRAM Report of Overall Trend Assessment & Analysis Report, 2011)
- School maintenance still practiced in an unsatisfactory level, which lead to the increment of the maintenance cost (Ali, 2013, Mahli, 2012)



AIM & OBJECTIVES

The research aim is to develop a building deterioration prediction model (BDPM) of building condition based on factors contributing to building defects

OBJECTIVES

RO1 -To identify the factors contributing to the building defects

RO2 - To investigate the condition of the school buildings through condition assessment

RO3 - To establish significant relationship between the factors contribute to defects and building condition

RO4 -To develop a prediction model on the building condition



DELIVERABLES

- **A List of factors** that affected building condition
- **Compilation** building rating and **record** of defects findings
- **Group of significant variables** between the factors and building condition was identified
- **A Regression equation** to predict the probability of building condition variation

THEORETICAL FRAMEWORK

Independent Variables

Technical

1. Faulty Design
2. Not Complying with Specification
3. Structural
4. Poor Waterproofing
5. Improper use of Material
6. Lack of Maintenance
7. Poor Construction

Environment

1. Insect Attack
2. Biological Agent Attack
3. Changes of Climatic Condition
4. Reaction Thermal Agent
5. Excessive Moisture
6. Reaction Chemical Agent
7. Soil Movement Impact

Human

1. Misuse by User
2. Vandalism
3. Wear and Tear
4. Change of Usage
5. Poor Workmanship
6. Lack of Supervision
7. Lack of Cleaning

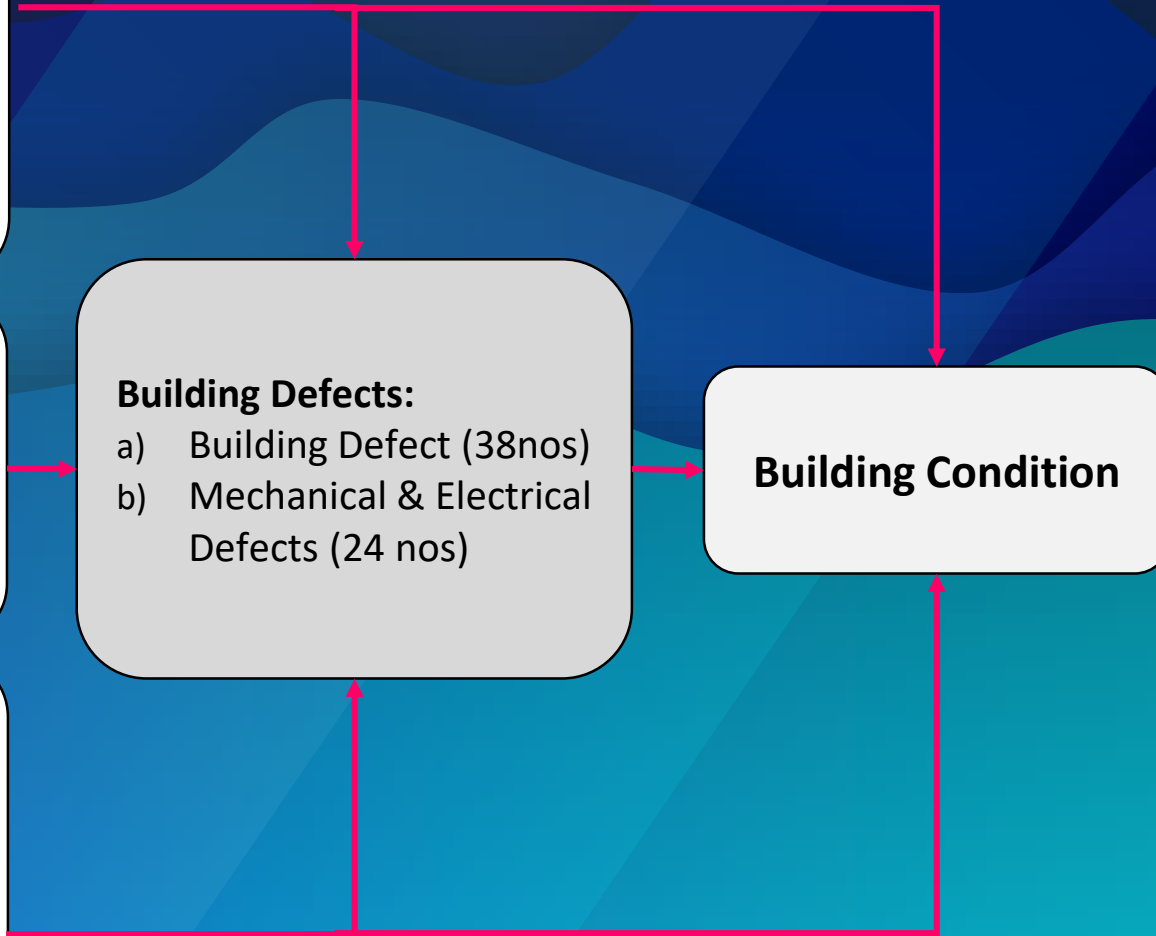
Mediating Variables

Building Defects:

- a) Building Defect (38nos)
- b) Mechanical & Electrical Defects (24 nos)

Dependent Variables

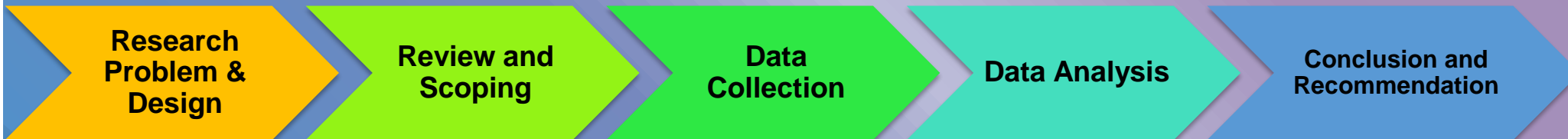
Building Condition



RESEARCH METHODOLOGY



RESEARCH PHASES



RESEARCH ACTIVITIES

- Initial review, research problems & needs,
- Research proposal, research
- Program & methodology

- RO1, RO2, RO3, RO4
- Literature review, Articles, journals, books, previous research report

- 303 numbers **Public school building** in Malaysia
- Quantitative:- Archived documentation (BCA, BCMAS reports) (Structured assessment with the Likert Scale)
- Qualitative:-Semi-structure interviews

- Quantitative:-BCARS (Building Condition Assessment Rating System) – Structured Rating with the range of grade
- SPSS: Statistical Analysis :- Descriptive, Content, Reliability, Correlation and Logistic Regression Analysis
- Qualitative:-Semi-structure interviews (verify, validate the result, and additional statement from respondents)

- Tie-up objectives, come out with prediction model of Building

SUMMARY RESULT FINDINGS

OBJECTIVES

FINDINGS

CONCLUSION

RO1: To identify the factors contributing to the school building defects

- 3 most significant factors are: Lack of Supervision, Lack of Maintenance and Vandalism

- Only 21 factors were ranked for most factors contribute to building defects from 29 factors adopted in the study

RO2: To investigate the condition of the buildings through building condition assessment

- Total number of building:
 - Good condition - 16 , Fair Condition – 221 , Critical condition – 65, Very critical – 1

- 72.67% the condition of the school with fair condition, 21.67% with poor condition, 5.33% with good condition, and 0.33% with very poor condition

RO3: To establish significant relationship between the factors and building condition

- 6 factors has strong significant relationship are: Lack of maintenance, Vandalism, Poor waterproofing, Lack of supervision, Lack of cleaning and Misused by user

Factors which have strong, least significant affect the overall condition the building and should be taken into consideration in order to minimize or eliminate the defect of the building.

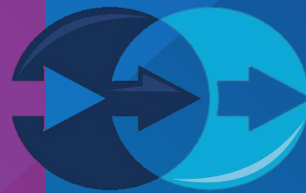
RO4: To develop a prediction model based on building condition

- 3 most significant factors are: poor waterproofing, lack of maintenance and lack of cleaning

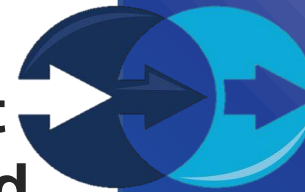
- The variables significantly improve the model as a predictor is poor waterproofing, lack of maintenance and lack of cleaning.

THE IMPORTANCE OF RESEARCH TOWARD GOVERNMENT POLICY

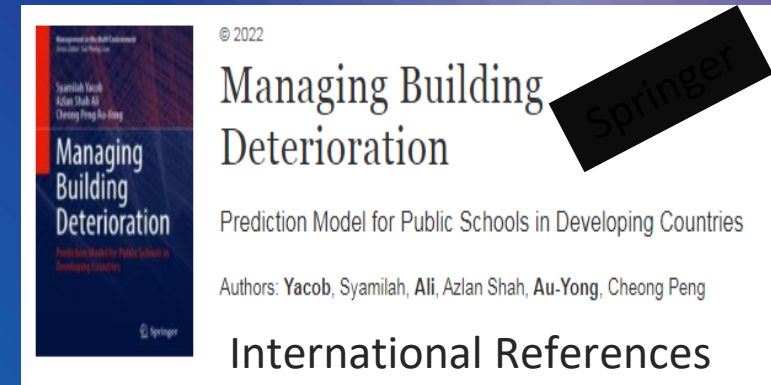
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As a process in enhancement of Government Asset Policy and Standard



Systematic tools approach toward operation and maintenance aligned with Government digitalization policy



THE IMPORTANCE OF RESEARCH TOWARD GOVERNMENT POLICY

GOVERNMENT'S POWER SOURCE

1

Perintah Am, Chapter E,
Clause 27

JKR is mandatory to carry out the
inspection for government building

Government Asset
Management Policy /
Guideline

2

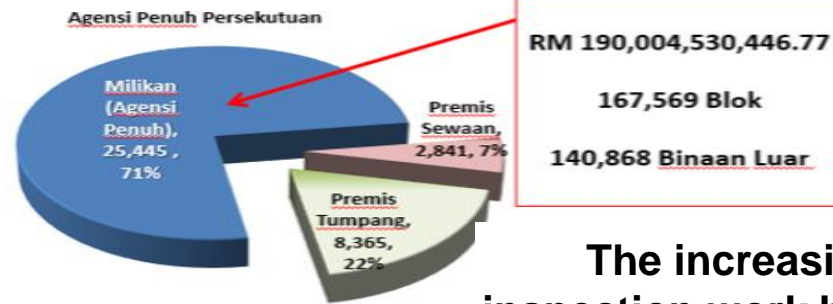


3

Jumlah Aset Bangunan Kerajaan

DAFTAR ASET mySPATA FASA 1

(sehingga Ogos 2017)



The increasing of
inspection work by Ministry

Maklumat Rekod Bangunan Sehingga Ogos 2017

5



Manual
Inspection



AP 182

4

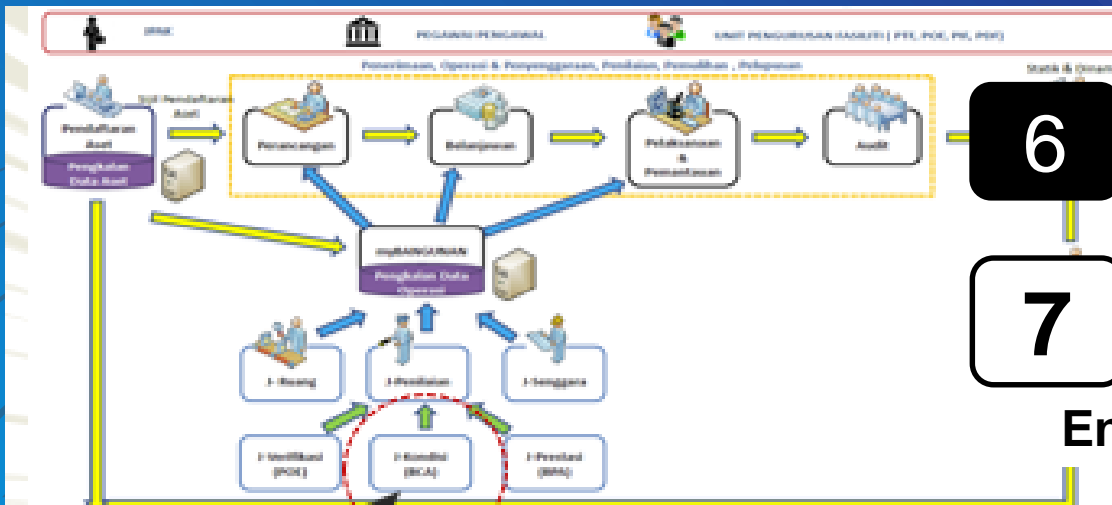


6

BCA Needs in MySPATA

7

JKR Core Task As in
Enterprise Architecture JKR

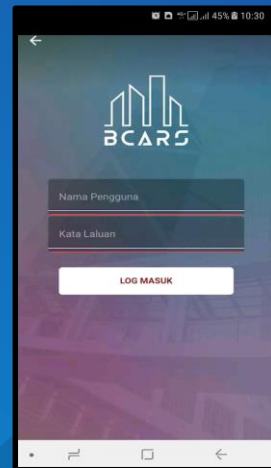


THE IMPORTANCE OF RESEARCH TOWARD GOVERNMENT POLICY TOOL SIGNIFICANT

ISSUES

- Building Defects
- Building Deterioration
- Life cycle of Asset
- The condition of the Assets
- Maintenance & Operation Cost
- Human Resources
- Supply and Demand

PROPOSAL



To develop a system to ensure the “supply = demand” concept is achievable and toward IR. 40 government’s digitalization



Web System
and Mobile
Application

BUILDING CONDITION ASSESSMENT RATING SYSTEM (BCARS)

1

Increase the effectiveness of Government Service Delivery especially in Government’s Asset & Maintenance Management

2

- Leverage the used of Technology toward digitalization, innovation in Government Asset management

3

- Governance Stabilization to enhance the Government Service Delivery

THE IMPORTANCE OF RESEARCH TOWARD GOVERNMENT POLICY

INSPECTION OF GOVERNMENT'S BUILDING BY JKR 2021 FOR MAINTENANCE & OPERATION



THE IMPORTANCE OF RESEARCH TOWARD GOVERNMENT POLICY

GOVERNMENT WAY FORWARD

Increase the effectiveness of Government Service Delivery especially in Government's Asset & Maintenance Management

- The enforcement of PWD Building Inspection Guideline as Asset Management
- The Purpose of Building Inspection (BCA):-
- Building Rating
- Building Performance
- Operation & Maintenance
- Upgrading, renovation, refurbishment
- Building Disposal

Leverage the used of Technology toward digitalization, innovation in Government Asset management

- To used innovation & technologies effectively and comprehensively
- Published and presentation the research of application local and internationally.
- To leverage the used of BCARS to Ministries and Agency, PWD in order to ensure the positive impact to government to satisfy the client

Governance Stabilization to enhance the Government Service Delivery

- Training BCARS to all PWD States and District which involved Building Surveyor and Engineers
- Development of Competency Index and documentation modul to enhance the skill of building inspector
- To increase serve to customer to achieve PWD vision & Mission (systematic, comprehensive & integrity)
- Supervision of the execution of PWD strategic Plan, and Operation Startegic Plan KKR PSO KKR 2021 - 2025

THANK YOU