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Dilapidation Survey and Report: A Case Study of Sekolah Menengah Pendidikan Khas Vokasional Shah Alam (SMPKVSA)

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Dilapidation report and dilapidation survey the two processes done in stages to provide information about existing building structure for further action by its owner or manager. Building surveyor will do their survey to existing structure of a building which this action called dilapidation survey before they could produce official report about the condition of that building which the report name was dilapidation report for further action. This article intended to give an overview on the importance of dilapidation survey and report. The method of this research is focusing on the case study which a dilapidation survey and report done for Sekolah Menengah Pendidikan Khas Vokasional Shah Alam beside literature review about dilapidation survey and report. This article will discuss about a method to do defect inspection on site known as dilapidation survey and a method to produce an official report recording all the defect found known as dilapidation report. Also, a significant of Dilapidation Survey Report in construction industry as well as their role in building conservation. The findings from this exploratory review conclude that the importance of building dilapidation survey and report even it was a tedious and time-consuming process

Keywords: Dilapidation Survey, Dilapidation Report, School

1. INTRODUCTION

Dilapidation report and dilapidation survey the two processes done in stages to provide information about existing building structure for further action by its owner or manager. A Dilapidations Survey is a thorough examination of the state of a building's components and systems, down to minor wear and tear and discoloration. Ideal for validating contractor performance prior to letting or cancelling a contract (oakleaf, n.d.). In Malaysia, A pre-construction condition survey is often known as a **dilapidation survey** (or sometimes called structural survey). A dilapidation survey is a professional building surveyor's assessment of the existing structural state of the surrounding buildings and structures prior to the start of demolition, construction, or development. All visible flaws, such as cracks, settlement, movement, water seepage, spalling concrete, deformation, subsidence, and other structural difficulties, will be documented and recorded. (P-CON Building Surveyors, 2008).

A dilapidation report, also known as a building condition report, is a document that documents the pre-construction status of properties that are next to the developer's site and/or may be influenced by the developer's work. Any current structural damage and places prone to deterioration, such as movement in driveways, deflections in walls, fractures in brickwork, and concrete, are noted and photographed in this objective assessment with no bias to the owner or developer (NeilyDavies, n.d.). From both

definition we can conclude that dilapidation survey is a process to produce dilapidation report. Building surveyor will do their survey to existing structure of a building which this action called dilapidation survey before they could produce official report about the condition of that building which the report name was dilapidation report for further action.

2. LITERATURE

Dilapidation survey and dilapidation report is very important to ensure building and its structure always in safe and good condition. Dilapidation surveys, also known as pre-construction condition surveys, are used to keep track of the status of a building before and after construction. While it is unlikely that the nearby development would cause structural damage, the inspection is being done as a precaution. A Professional Building Surveyor's survey report will aid building owners, contractors, and developers in the event of a damage claim, as the dilapidation survey report provides written data on the property's pre-construction condition (P-CON Building Surveyors, 2008).

Figure 1 – Dilapidation Survey

InspectMyHome define both dilapidation survey and dilapidation report as a thorough examination and written report on the present state of a dwelling's neighbouring properties. It's a means for homeowners to take adequate precautions and keep track of their home's present state. This is usually necessary prior to and after a major construction or demolition project. A condition report, also known as a dilapidation inspection, is required in order to secure a Development Approval (DA) for a project that may cause possible harm to an adjacent property or properties. (InspectMyHome, 2020).

The condition report is completed not only to safeguard the safety of surrounding assets, but also to protect the developer's interests. Both parties may easily discover any existing building faults as well as damage that may have occurred because of the development work by comparing the before and after construction reports. This way, possible disputes can be avoided before they arise (InspectMyHome, 2020).

2.1 The Importance of Dilapidation Survey Process

According to Adam Sokac (2017), dilapidation surveys (also known as building condition reports) aren't the most glamorous services available, but they're nonetheless necessary, especially if you're a contractor or developer preparing to start a new project. If necessary, safeguards are not followed, works such as building construction, high-rise development, infrastructure projects, road works, demolitions, and excavations can result in flaws emerging in adjacent structures. The resulting damage can be costly to fix and proving how it happened and who is to blame can be challenging. According to him again, this is the main three reason why a dilapidation survey should be conducted (Adam Sokac, 2017):

- Independent precautionary measure.
- Understand the condition of structures prior to construction
- Provides evidence to counter fraudulent claims, liabilities & actions

Independent Precutionary Measure

A dilapidation survey describes the current state of the property and any existing structural damage, as well as areas that may be vulnerable to harm. Cracks, strains, and water damage to floors, walls, cornices, and ceilings; cracks in brickwork, road surfaces, and neighbouring walkways; and deterioration of roofs, gutters, downpipes, and other external fittings or features are just a few examples (Adam Sokac, 2017).

The survey results are presented in the form of a final report that contains detailed images, video, and a written section. By hiring a professional surveyor, you will receive an unbiased report that does not favour one party over the other (Adam Sokac, 2017).

Understanding the Condition of Structure Prior to Construction

By conducting a survey prior to the start of work, the building owner can thoroughly examine

the surrounding structures and ensure that all necessary precautions are taken to minimise movement, vibration, water overflow, loose site debris, or any potential modification to adjoining surfaces or features (Adam Sokac, 2017).

After the work is finished, a dilapidation survey can be utilised to restore the site. If roads, landscaping, or other features must be removed during development, the survey will be used to guarantee that the areas are returned to their former state (Adam Sokac, 2017).

ROVIDES EVIDENCE TO COUNTER FRAUDULENT CLAIMS, LIABILITIES & ACTIONS

Contractors and developers are commonly accused of damage to third-party and nearby properties. If a claim is submitted and a dilapidation survey is not performed, you may be held liable for any damages. Your firm will have the original site condition report as documentation to defend any damage claims that may arise if a study is performed prior to the commencement of the project, avoiding expensive and time-consuming litigation (Adam Sokac, 2017).

2.2 DILAPIDATION SURVEY PROCESS IN BUILDING CONSERVATION

According to S.N. Harun (2011) building conservation practice requires involvement from building owners, building user as well as expertise of various professionals such as town planners, conservation architects, building surveyor, specialized engineers, building contractors, archaeologist, art historians and antiquities. They will be assisted by other trained specialists such as craftspeople, biologists, chemists, archaeologists, and geologists. All of this expertise requires a high degree of collaboration, coordination, experience, communication, and understanding of building materials and construction, especially when dealing with historic buildings, where repair and conservation work may be expensive. The accurate diagnosis of architectural faults, as well as suitable repair measures and dedication to conservation principles, are the essential economic foundations for effective conservation. There were three (3) primary steps to the conservation process:

- Documentation and Record
- Dilapidation Survey and Building Investigation
- Conservation Works

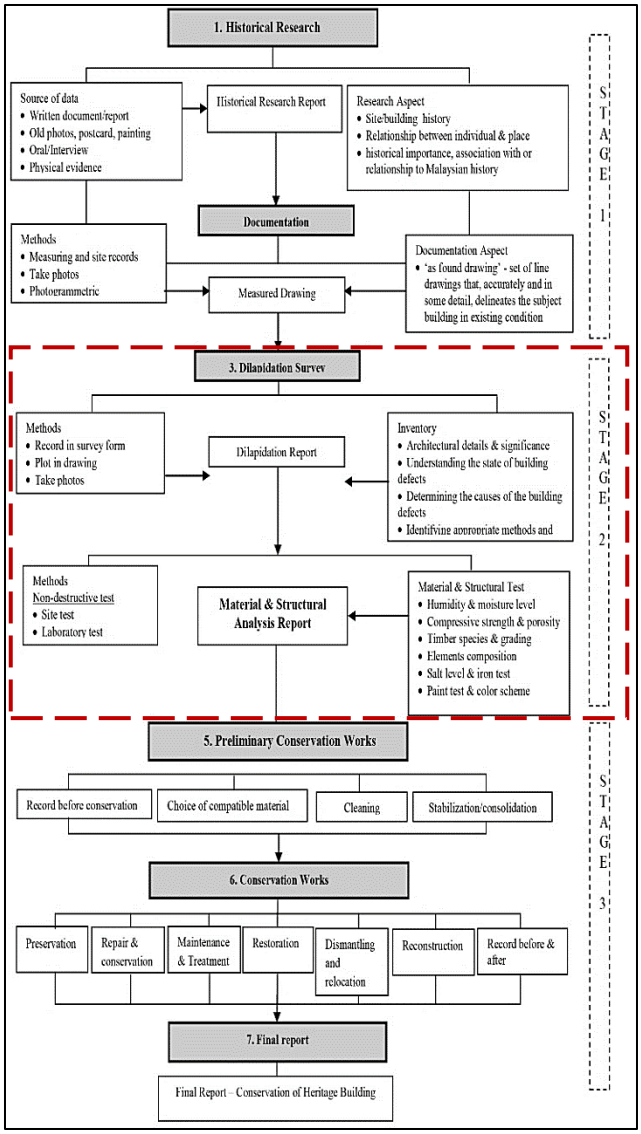

Figure 2 – The basic conservation activities in current practice

Graphic adapted from S.N. Harun (2011)

3. METHODOLOGY

The practical 'how' of any specific piece of research is referred to as methodology. It's about how a researcher plans a study in a methodical way to produce accurate and reliable findings that meet the study's goals and objectives (Derek Jansen & Kerryn Warren, 2020).

The first method used in this research was site observation. The technique of recognising and identifying people, items, and gathering information on the spot is known as on-site observation. The analyst's task is to gather information while remaining detached from the

system under investigation. The job allows for open and unrestricted interaction with the user personnel (Priyali Sharma, n.d.). We've been given a task as group work on our first assignment to do the dilapidation survey and produce the dilapidation report for Sekolah Menengah Pendidikan Khas Vokasional Shah Alam (SMPKV). Jabatan Kerja Raya Malaysia (JKR) has opened a construction tender to fix on old school under their jurisdiction in this case, SMPKV. Inspira Resources had been awarded those tender and need to produce Bill of Quantities (BQ) report to assess the cost of construction and conservation. With our cooperation together with their supervised expert surveyor, we were responsible to do dilapidation survey and produce dilapidation report afterwards. That report will be used to produce a BQ for this conservation project of SMPKV.

SMPKVSA began boarding at Setapak Special Education Secondary School, Jalan Genting Klang, Kuala Lumpur, on January 5, 1987. SMPKVSA is a daily boarding secondary school for hearing impaired Form 4 and 5 students from all around the country. SMPKVSA relocated to its permanent location in Jalan Senangin 17/2, Section 17, Shah Alam, Selangor, on February 1, 1988. On November 15, 1996, YB Dato' Seri Mohd. Najib bin Tun Abdul Razak formally launched the school. On March 1, 1993, SMPKVSA was promoted to a Grade A school, and on January 1, 1998, it was designated as a Responsibility Center. The Ministry of Human Resources' Department of Skills Development (JPK) has designated this school as an Accredited Centre (K05048) for 12 occupational skills courses offered. (SMPKVSA, n.d.).

Figure 3 – Sekolah Menengah Pendidikan Khas Vokasional Shah Alam (SMPKVSA)

Beside site observation, literature review also one of method in finding this research. A literature review is a critical analysis of academic texts on a particular subject. It gives you a broad perspective of current knowledge, helping you to spot key ideas, techniques, and research requirements. (Shona McCombes, 2022). A book, an article or an internet information are a great source for this research.

4. FINDING

The primary way to survey an old building dilapidation was through a lot of observation with proper equipment such as camera and drone for that observation to be captured and recorded in order to produce an official report afterwards. However, it was not as easy as observation only. The knowledge to identify the defect should be studied ahead before doing that observation. Beside observation, organization skills and planning skills are also important when doing this dilapidation survey and dilapidation report. This is because, the defect that found in the site might too many until you don't even remember where the exact location of that specific defect is.

This research finding will be split into two part which is:

- Dilapidation Survey: A survey done on site to collect all information about the building.
- Dilapidation Report: An official document that will be produced after all information has been gathered on site.

4.1 Dilapidation Survey

There are several key points to discuss this subtopic. These key points are a step-by-step process of doing site dilapidation survey:

- Dividing building component
- Tagging Series
- Sequence & Tagging remark on drawing
- Taking picture
- Gathering and discussion

Dividing Building Components

The first thing to do when to perform site survey dilapidation is to begin with dividing the building component in several part if the defect found was too many to handle under a single component. Doing site survey at SMPKVSA was no exception to perform this stage since the defect found on building for example Block D was a lot and its need to be organised. We divided the building component according to their type:

- Floor Dilapidation
- Wall Dilapidation
- Window & Door Opening Dilapidation
- Ceiling Dilapidation
- Internal Door Dilapidation

Since the defect was a lot, a team of pair will take the part of the building to be observed and recorded. Each team will have their own tagging series and camera to record all those defects.

Tagging Series

Once we get which part of the building to be inspect, tagging series will be created written on a sticker paper. This sticker will be stick close to the defect found and to be interframe in the captured defect image. This step will contribute a huge help later when we want to sort the recorded image since the tagging contain the block name, defect location and defect number. For example, tagging series D4006 was a defect found in Block D at a ceiling component and defect number 006. 'D' represents Block D, '4' represent series for ceiling and '006' represent the number of defects.

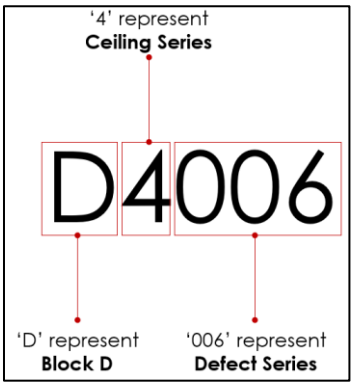

Figure 4 – Example of tagging series

If the building contains more than 1 floor another series was introduced in the tagging which indicated the floor that defect was found. For example, tagging series AG1010 was a defect found on Block A, at ground floor, in floor component and defect number 010. 'A' represent Block A, 'G' represents ground floor, '1' represent series for floor and '010; represent the number of defects.

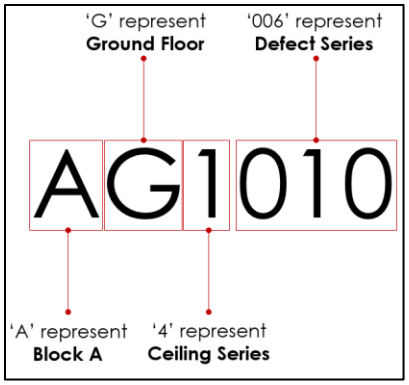

Figure 5 – Another example of tagging series

Sequence and Tagging Remarks on Drawing

Once done doing producing tagging, a next stage in dilapidation survey on site was to determine the sequence of the tagging. This means that the picture that will be taken together with tagging should be in sequence of order according to space. This stage was crucial and very important as another building inspector later will inspect the defect in one way which when we do this tagging on sequence and follow space sequence, it will ease their job.

For example, doing inspection for ceiling component, the inspection was bay by bay according to the ceiling plan and when doing inspection for window and door opening component, it was referring to the elevation drawing and start from left to right.

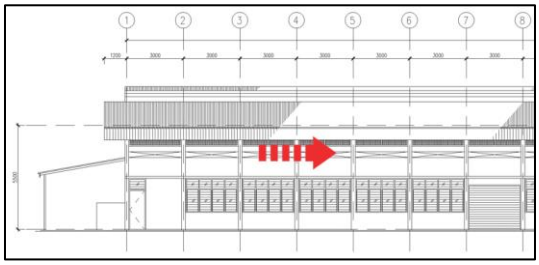

Figure 6 – Part of Block D elevation drawing indicating inspection sequence for window and door opening component

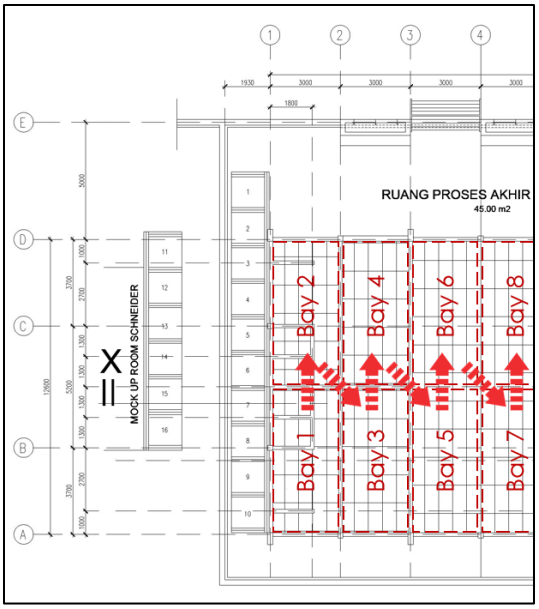

Figure 7 – Part of ceiling plan of Block D showing inspection sequence for ceiling component.

Before taking a picture to record the defect, the tagging of the specific defect should be jot down in the give floor plan and if they are no floor plan provided, a sketch would be enough to remark where the location of that defect is. This stage also important because later in the dilapidation report, a building drawing with defect tagging will be there to be review.

Taking Pictures

When taking picture of the defect, the image should be clear and if the room was dark, a light should be turn on, and if the light was unavailable, surveyor should use torch light to highlight those defects. Beside a clear image, the tagging should be visible in the frame of the picture. This not necessarily required but it would help us later when the defect image was too many. Lastly, the image should have date stamp on it. This is important since it will mark a date the site is inspected by surveyor. Also, to help as a proof if any dispute occurs later.

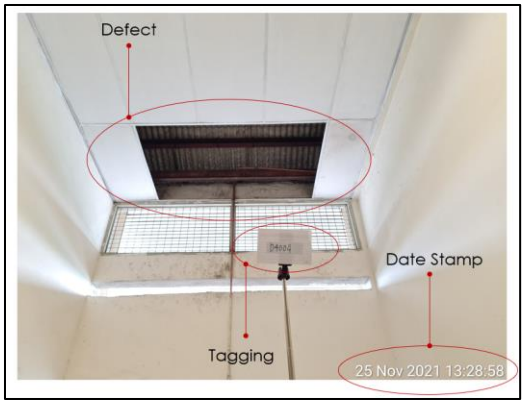

Figure 8 – Example of captured defect image.

Figure 9 – Capturing defect in ceiling component of the building

Figure 10 – Capturing defect in floor component of the building

Gathering and Discussion

After all defect has been captured and recorded, we will gather and discussed on the defect that we found. The discussed topic usually includes, defect cause, defect repair method, defect level and much more.

4.2 Dilapidation Report

Dilapidation report is an official report documenting all the defect found in the inspected building in previous stage which is dilapidation survey. This report usually contains information such as introduction, job scope, defect list, overall site plan, drawing with defect tanging, defect pictorial evidence and overall building condition. Producing all of mention item is not an easy task in addition if the building is an old building and the defect found was too many. These key points are a step-by-step process of producing dilapidation report:

- Job scope & overall site plan
- Image Sorting
- Drawing with defect tagging
- Defect pictorial evidence
- Overall building condition
- Defect List

Job Scope and Overall Site Plan

In this part of report, writer usually introduced the site by having aerial view of the site or site plan of the site. Beside that job scope also will be stated to inform the scope of the dilapidation report means what is covered in this report.

In SMPKVSA dilapidation report the job scopes are dominantly an interior work but some outdoor work such as roof repair are included to settle some defect that damaging interior part of the building such. Besides that, defect that affecting the safety integrity of building users such as crack on the roof trusses also included although it is out of scope.

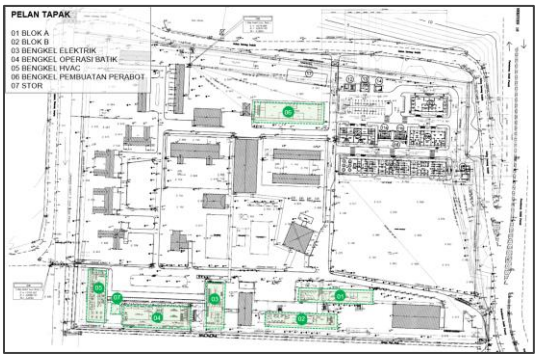

Figure 11 – Site plan of SMPKVSA with highlighted scope of work.

Image Sorting

Defect image that been captured by camera on site should be transferred to the computer to sort and rename accordingly. Doing dilapidation report for SMPKVSA, more than 500 photos were taken on site. Proper organisations are very important to avoid confusion because those images could easily switch with other images since of the photo are zoomed in and we were unable to recognize the background. This is where in frame photo tagging play their role. The defect photo can easily be recognized their block, location, floor level, position, and series just by referring to those tag numbers.

Drawing and Defect Tagging

Previously, when doing dilapidation survey on site, the defect position was jotted down in the floor plan, elevation or section drawing of the building. Here where the position of tagging is used to produced proper defect tagging. This tag drawing will help building inspector or quantity surveyor to find the location of defect.

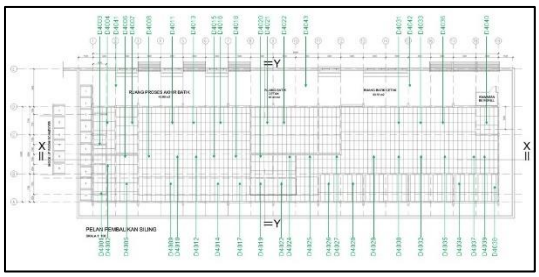

Figure 12 – Ceiling plan with defect tagging of ceiling dilapidation in Block D SMPKVSA

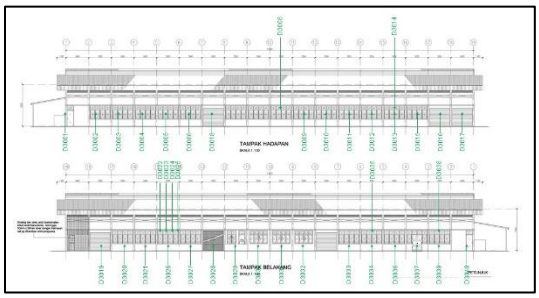

Figure 13 – Elevation drawing with defect tagging of windows and doors opening dilapidation in Block D SMPKVSA.

Defect Pictorial Evidence

In this section, defect picture previously taken on site will be used one by one. Each defect will be list out here without missing any single defect. There's also reference number that will be created in accordance with their tag number, date the picture was taken, location of the defect and the defect note that state what kind of defect found there.

No. Rujukan	AG1007	Tarikh: 26/11/2021	No. Rujukan	AG1008	Tarikh: 26/11/2021
Lokasi	Lantai		Lokasi	Lantai	
Nota	Lepa simen pda *skirting grouting* pecah		Nota	Lubang kecil pada permukaan jubin	

Figure 14 – Defect pictorial evidence of floor defect on ground floor, block A, SMPKVSA.

No. Rujukan	D4035	Tarikh: 25/11/2021	No. Rujukan	D4036	Tarikh: 25/11/2021
Lokasi	Siling		Lokasi	Siling	
Nota	Kesan / tanda air pada kepingan siling berjaring		Nota	Kepingan siling gantung hilang Kesan / tanda air pada kepingan siling gantung Kerangka bumbung berkarat	

Figure 15 – Defect pictorial evidence of ceiling defect, Block D, SMPKVSA

Overall Building Condition

Overall building condition is a conclusion on what site surveyor see on site and off site. On site means what is their finding during their visit to site with their own observation while off site conclusion often could be analysed through seeing pictures taken on site. Due to this, overall building condition will be produced after report's writer done listing all defect pictorial evidence. Although this overall building condition are produced nearly in the last stage, this part of the report should be presented in early part of the report before plan tagging. This arrangement will allow reader of dilapidation report to know overall building condition before they are going to see the defect one by one in detail. In this overall building condition, information such as floor dilapidation, wall dilapidation, doors and windows opening dilapidation ceiling dilapidation as well as internal doors dilapidation will be explained in word and table form as a data.

Defect List

Here is the last part to be produced in the report, as same as overall building condition, this part will be placed in the first part of the report together with the scope of the report. This arrangement was to allow some reader just to read this part without having to pass through a lot of other pages showing mostly defect pictorial evidence because not all reader want to check those defects one by one.

Defect list part is the part that show what kind of defect that found in the building from all components of building whether is from floor, wall, doors and windows opening, ceiling or internal doors opening.

5. DISCUSSION

A dilapidations survey is a thorough examination and assessment of a building's current state, from its physical structure and systems to issues such as furnishings and general wear and tear (Bradley-Mason, n.d.). The significant of doing this survey was very wide in give a purpose to various parties. As discussed earlier, survey done for SMPKVSA was to issue the Bill of Quantities (BQ) by contractor. The BQ is a document that lists the materials and labour quantities used in a construction project. It is normally created on behalf of the principle by a professional QS using precise drawings and specifications (David & Baccarini, 2002). According to Rashid et al., (2006) The BQ is primarily used for cost estimation and, more crucially, as part of a tender document to elicit competitive bids from contractors.

From the dilapidation survey result, the contractor could determine the construction cost of the job scope. In the case of SMPKVSA, every examined defect will be assessed to determine the way to repair the defect, the defect cause, the prevention method, and the cost to repair those defects. For example, on the defect picture number D3025 which could be read as Defect on Block D, located at door and windows opening of the building and sequence number 025 showed that the jalousie window cannot be fully adjusted means the window could not be opened and closed anymore. There also crooked effect on the frame of the window as well as missing some glass panel. From the information Quantity Surveyor (QS) could determined what action should be taken to conserved and repair this window. The reason the frame was crooked was due to some student action that use those window frames to hang their personal belonging like bag and necktie that could be seen during site survey.

Figure 16 – Defect number D3025

In other example, defect number D4033 which could be read as Defect on Block D, located at ceiling components of the building and sequence number 033 showed several defects. Among the defect are missing suspended ceiling panel, water stain on existing suspended ceiling panel, rusty roof trusses and leaks on the roof panel as sunlight could penetrate inside. On this defect alone, contractor and surveyor should know that this part of building required serious attention. Roof panel need to be replaced to avoid water penetration into building interior, ceiling panel with water stain should be access and replace if required, missing ceiling panel should be replaced, and rusted roof trusses should be replaced as it affects the structural integrity of the building. With detail like this, QS could easily assess the repair cost at once producing BQ afterwards.

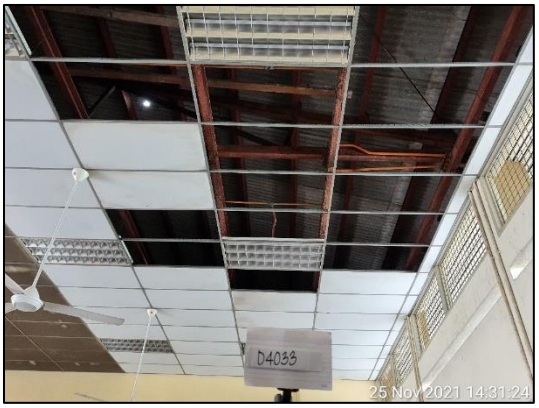

Figure 17 – Defect number D4033

According to A. Ghafar Ahmad (2004) the process of securing information on old and heritage structures has long been seen as critical to understanding the current state of the structure and its flaws. The dilapidation survey is a method of collecting and documenting critical building information in a precise and methodical manner. Dilapidation surveys are becoming more popular in Malaysia and internationally, and they are frequently requested by clients or building owners. Dilapidation surveys are typically completed in advance of work which required to correct any discovered building problem; as a result, they are best performed as part of the documentation for those tasks. Due to a lack of awareness of the magnitude and nature of the building faults, the conservation project's methodology and scope of repair work would be incorrect, resulting in conflicts and significant financial consequences among clients, building owners, as well as contractors.

A dilapidation survey is the practise of finding and recording architectural problems using photographic together with digital data preliminary to all conservation work. The survey, which is often carried out by building conservators, requires in-depth assessments of the building defects, their causes, and recommended building conservation methods and processes. The data and information collected during the dilapidation research is frequently analysed, recorded, and delivered in a technical report, which will utilised to develop project briefs, building specifications, and the Bill of Quantity (BQ). (A. Ghafar Ahmad, 2004).

Because building conservation sometimes requires a range of rectifications and repairs, a thorough diagnosis and documentation of building flaws is essential when deciding which conservation tactics and techniques to employ. Historians, architects, conservators, structural engineers, mechanical and electrical engineers, and quantity surveyors are all involved in dilapidation investigations. Microbiologists, chemists, archaeologists, and geologists are sometimes called in to help. Microbiologists advised on the treatment of hazardous growth and fungal taint at Fort Cornwallis in Georgetown, Penang, while archaeologists were hired to perform archaeological work, including tracing the destroyed historic fort walls and the building's ruins. In the field of building conservation, dilapidation surveys are often performed to assess the following criteria:

- Recognizing the current situation of the building defects
- Identifying the sources of building faults
- Identifying relevant building conservation methods and strategies

- Providing clients, consultants, and project contractors with reference materials
- Providing a critical resource for the Historic Architectural Building Survey (HABS)

Because recording and documenting are the most important aspects of dilapidation surveys, a thorough examination of the building's status, issues, and causes is necessary. The status and character of the existing building elements should be adequately recorded in both photographic and digital versions for documentation reasons. Existing building materials, whether constructed of wood, brick, stone, plaster, or concrete, should be properly studied, and recorded. The foundation, roof, flooring, doors, windows, and stairwells are all in bad shape. Balustrades, pinnacles, cornices, and festoons should all be noted if they have been damaged or missing in the past. All structural flaws should be recorded and traced on floor plans, sections, and elevations in their precise places. All windows, doors, stairwells, and rooms should be coded for cross-referencing. (A. Ghafar Ahmad, 2004).

The dilapidation survey report shall indicate the scientific studies and testing that should be carried out during any conservation activity. These kinds of scientific research and laboratory testing are important because they give additional knowledge that may help resolve related construction concerns or defects. Microbiological studies to identify plant species, dispersion agents, control ranking, and chemical fungicides, as well as archaeological studies to locate hidden remnants and relative humidity studies to determine local temperatures and air moisture levels, are all common scientific studies required during conservation work. A few of the laboratory tests required are the brick test to determine compressive strength and porosity; the timber test to identify timber species, grading, and group strength; the lime plaster test to determine component elements through X-ray Fluorescence (XRF) analysis; the salt test to detect salt levels and the percentage of total ions; and the paint test to classify paint types as well as colour scheme analysis. Separate reports should include all data and analysis provided by scientific investigations and laboratory tests. (A. Ghafar Ahmad, 2004).

In order to adequately analyse architectural defects, identify their sources, and suggest restoration options, dilapidation surveys should incorporate a multidisciplinary approach that demands in-depth experience in conservation as well as other vital fields. Relevant scientific research and laboratory testing are especially important since the findings provide a strong basis for conservation decision-making. Improper building condition diagnostics, as well as the ineffective remedial procedures that follow, may put historic building structures at danger and cause public safety problems. As a consequence, it's necessary to invest some money in a dilapidation study before starting any conservation effort. The dilapidation survey report, once completed, is a significant archival resource for future referencing and cycle building maintenance plans.

6. CONCLUSION

From all the findings and discussion, it is known that dilapidation survey report is not a necessary thing to be done. However, this step is quite important to be done to conserve the new building, old building as well as building that exposed to surround construction hazards. Some building owners or client does not bother to hire a professional surveyor for this dilapidation survey and report because they see that it’s a waste of money to pass through an unnecessary stage of construction, renovation, conservation, or just minor repair work. They rather directly refer to the contractor to access the damage and just repairing it at once. Without having proper knowledge, a contractor can easily produce mistake without having proper advice from professionals and causing client to lose more money and still having undesirable result.

This dilapidation survey and report also important in order to help Quantity Surveyor (QS) producing Bill of Quantities (BQ) for opening or awarding tender to the contractor especially on conservation job scope. Although the process of site dilapidation survey as well as producing building dilapidation report is tedious and time-consuming process, it is very important as important as architect design in the proposed building construction project. So, in conclusion, the importance of this dilapidation report and survey to be taken into consider seriously when analysing project involving existing conserve structure.

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