

**DEPLOYMENT OF ENHANCED BUILDING AND GROUND  
MAINTENANCE MANAGEMENT SYSTEM FOR  
ISPSC STA. MARIA**

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## Chapter I

### INTRODUCTION

#### Project Context

Building Maintenance is a computer-based control system installed in buildings that monitors record. Maintenance of a building is a process of reservation and restoration activity of the structure and components of a building. It covers the whole building which includes toilets, rooms, walls, roofs, drains, doors, windows, floors and also the fix furniture. Building maintenance performs general repair to buildings and preventive maintenance of systems and equipment.

Maintenance management system is the process of overseeing maintenance resources so that the organization does not experience downtime from broken equipment or waste money on inefficient maintenance procedures. Maintenance management software programs can assist with the process. The primary objectives of maintenance management are to schedule work efficiently, control costs and ensure regulatory compliance. This management maintenance is an administrative, financial, and technical framework for assessing and planning maintenance operations on a scheduled basis.

Twin Cities is a major metropolitan area built around the Mississippi, Minnesota and St. Croix rivers USA. The area is commonly known as the Twin Cities for its two largest cities, Minneapolis, the city with the largest population in Minnesota,



and Saint Paul, the state capital. It is an example of twin cities in the sense of geographical proximity. Both cities anchor the third-largest economic center in the Midwest after Chicago and Detroit. Since 1987, BMM (Building Maintenance Management) has contracted its maintenance services to facilities throughout the Minneapolis/St. Paul metro area and the surrounding communities. The customers represent a variety of facility types including multi-housing, medical and commercial. BMM provides the services needed to maintain the property of the Twin Cities, allowing time to focus on core business without the headaches or facility issues.

The Manila Metro Rail Transit System, also known as the MRT Line 3, MRT-3, or Metrostar Express, is a rapid transit system of Metro Manila, Philippines and is composed of a single line that runs in the general direction along the north and south lanes of Epifanio de los Santos Avenue (EDSA). The MRT-3 has always presented itself as a safe system to travel in, which was affirmed in a 2004 World Bank paper prepared by Halcrow describing the overall state of metro rail transit operations in Manila as being "good". However, in recent years after the DOTC took over maintenance of the train system in 2012, the safety and reliability of the system has been put into question, with experts calling it "an accident waiting to happen", and while several incidents and accidents were reported between 2012 and 2014, that has not deterred commuters from continuing to patronize the system. The Philippine



government, meanwhile, continues to assert that the system is safe overall despite those incidents and accidents. In MRT maintenance is in need.

Ensuring that things are kept in working order by taking preventive maintenance measures is one of the smartest things that building owners can do. Apart from ensuring the safety of its inhabitants, proper building maintenance is also important in maintaining the aesthetic values of a building. After years of exposure to the harsh climate and conditions, the paint work will fade and peel, roof tiles can come loose, concrete pavements can crack and more. Sometimes buildings can also get damaged from freak events like heavy rain and strong winds. In short, just like the human body, buildings will degrade over time, and if left unchecked will lead to costly repairs in further down the road, Amojelar (2014)

The same case applies in Ilocos Sur Polytechnic State College (ISPSC) and as a result, there are a lot of building and or rooms that are now too risky to be with, for the materials are starting to fall apart because there are no proper maintenance in other hand the students gets hard to find good rooms for them to take their classes.

In line with the ideas mentioned above, the researchers tend to deploy an Enhanced Building and Ground Management Maintenance System of ISPSC Sta. Maria to make easier for the management to maintain the ISPSC Buildings in good shape.



## Purpose and Description

The following significant were brought to focus in the conduct of this study:

**Administrators.** Particularly the Director of Plan and Facilities which is Engr. Zosimo Liberato. The proposed system can organized the structured facilities undertaken by securing the problems and damages. It can also determine the maintained buildings and grounds that can also reduce their time and efforts.

**Utility Personnel.** Through this study, they are able to coordinate with the utility to monitor the daily progress of the building and ground of ISPSC Santa Maria Campus, for repairs and maintenance activities of the building and grounds.

**Researchers & Future Researchers.** The result of this study serves as basis for other researcher in developing and conducting for better outputs and future reference for researchers who have the interest in the same related project.

## Statement of Objectives

The study aimed to deploy an Enhanced Building and Ground Maintenance Management System for ISPSC Sta. Maria Campus to monitor maintenance records that could help the College.

Specifically, it sought to:



1. gather existing information in managing the Enhanced Building and Ground Maintenance Management System of ISPSC Sta. Maria;
2. design and develop Enhanced Building and Ground Maintenance Management System of ISPSC Sta. Maria;
3. test the application developed using test cases;
4. test the usability of the system for ISPSC Santa Maria Campus.

### **Scope and Limitation**

The study aimed to deploy an Enhanced Building and Ground Maintenance Management System for ISPSC Sta. Maria Campus. The system could help to manage the records of buildings at ISPSC Sta. Maria. The system can display a map of the Sta. Maria campus showing the names and images of the different building and facilities. It can also display and allow printing by providing features to add, update and edit records and print reports. The system can display a map of the Sta. Maria campus showing the names of the different building and facilities. It can also display and allow printing the information about the building and the maintenance records.

The study was limited to records of existing building and facilities for the school year 2017-2018. Only the designated Director of Plan and Facilities which is Engr. Zosimo Liberato will only be the administrator of



the said enhanced system. The enhanced system does not provide a dynamic interface for the clients and is only intended for them to view the system and can print the building information and floor plans.



## Chapter II

### REVIEW OF LITERATURE

#### Web-Based Information System

Web-based information displays many benefits of multimedia technology. Using today's fast broadband connection, it's possible to stream sophisticated content to a computer anywhere in the world. This is an advantage for many people as the information can be received and read wherever and whenever it is convenient for them, which can be a crucial factor for a busy executive. A significant amount of interactive multimedia content is now delivered via the internet.

Web information system, or web-based information system, is an information system that uses Internet web technologies to deliver information and services, to users or other information systems/applications. It is a software system whose main purpose is to publish and maintain data by using hypertext-based principles.

A web information system usually consists of one or more web applications, specific functionality-oriented components, together with information components and other non-web components. Web browser is typically used as front-end whereas database as back-end.

Today, the Internet and the World Wide Web support applications ranging from "small-scale, short-lived services to large-scale enterprise applications distributed across the Internet and corporate intranets and extranets:



1. These new information systems, called Web-based Information Systems (WIS), are growing increasingly complex because of new demands from organizations and new developments in Web and network technologies.
2. In order to control the scope and complexity of these systems, traditional information systems methodologies, such as those used for software engineering or database design, have been adapted and improved to address specific constraints of Web-based information systems. Because of the shorter development life cycle of WISs, which is driven by the rapid pace of innovations in Web technologies, studies have concentrated on the design and implementation phases of the system life cycle. However, requirements analysis is as essential in the development of a high-quality Web-based information system as it is in the development of a traditional information system, Sapp (2015).

### **Benefits of Web-Based System**

A web-based system is any system that uses a website as the interface (the 'front-end'). Users access the system from any computer connected to the Internet using a standard browser.

Web-Based System is easier to develop, more useful for the users, easier to install and maintain and keep secure and easier to grow as you grow.



## **Facilities Operations and Maintenance**

Facilities operations and maintenance encompasses all that broad spectrum of services required to assure the built environment will perform the functions for which a facility was designed and constructed. Operations and maintenance typically includes the day-to-day activities necessary for the building and its systems and equipment to perform their intended function. Operations and maintenance are combined into the common term O&M because a facility cannot operate at peak efficiency without being maintained; therefore the two are discussed as one, Sapp (2015).

## **Functional / Operational**

A clear understanding of the functional and physical requirements of a project is essential to ensuring its success. A client's or owner's intent to develop a project is derived from a need, a purpose or mission, and a desired result. When the design of a facility satisfies the emotional, cognitive, and cultural needs of the people who use it and the technical requisites of the programs it houses, the project is functionally successful. Program and functionality are also characterized by building type. A building that functions as it is intended is the underpinning of a quality "whole" building. The qualities of such a building may not even be noticed or recognized, but a poorly functioning building can be costly to correct, if the opportunity to correct ever becomes available. When



designs fall short of this goal, the cost can be modest to extreme, but the failures are generally noted more significantly than the expected successes. It has significant impact on the functional quality, and long-term efficiency and effectiveness of buildings, initially and over their life cycle, such as adaptability: decisions at the inception of project design to incorporate elements and concepts that will assist with future adaptations to a building can facilitate change in the future, building to readily facilitate horizontal; and vertical expansion and analyzing the building structural concept, i.e. structural grid, dimensions, and floor-to-floor heights that allow for flexibility in internal layouts, Groundzik and Kwok (2014).

### **Building Maintenance System**

BMS provides maintenance services, construction support, and building automation for a large variety of building systems. The knowledge, experience, and skills of our staff represent a valuable resource to the institution. We consider our department the “stewards” of all building systems, maintaining them for the current campus community and preserving them for future generations. The advantages are; see the status and have full control of the buildings infrastructure from one easy to use system; gone are the days of having to run around the building to turn things on/off or to check status; it also helps to reduce operating and maintenance costs; the system can alert you to an impending problem before it because an irreversible expensive repair,



and more Building Maintenance Systems effective planned and reactive building maintenance using Computer Aided Facilities Management (CAFM) systems.

As organizations demand a more efficient way of managing their sites at a reduced cost, the introduction of a new single Computer Assisted Facilities Management (CAFM) platform to schedule and manage all building maintenance tasks will maintain a strong delivery of service efficiency and reporting. This fresh approach to the management of building maintenance provides considerable improvements in accessing and monitoring performance information in order to schedule maintenance tasks effectively and react to emergency tasks as appropriate.

We develop asset databases to enable all planned and reactive maintenance to be managed and issued via our CAFM platform. All associated records are held electronically within the database and allocated to the relevant asset to enable a full audit trail to be effectively maintained.

Using Concept Evolution (CAFM) platform to manage all building maintenance tasks provides our clients with a number of benefits including: Transparency in the way service delivery and performance is managed so you can assess this against agreed Key Performance Indicators (KPIs), web-enabled access via a self-service portal for ease of access and use, an accurate, single view of all facilities and maintenance



information robust 'real time' management reporting, all planned maintenance schedules, task history, and plant lifecycle data is secure and readily available, and 4/7 help desk service for full system support, Nebraska- Lincoln (2016).

### **Buildings Operations and Maintenance**

This is a unique and complex issue: balancing keeping old equipment running while contemplating the impact of installing new more efficient equipment. Further, cleaning of delicate surfaces and artwork require the use of products that are less likely to damage these surfaces, while providing a healthy environment for the buildings healthy environment for the building's occupants. Understanding why building systems are operated and maintained the way they are, and where and what improvements are most beneficial and cost-effective is the first step to obtaining energy-efficient building performance. An O&M assessment provides a systematic look at all aspects of the current O&M practices including the management structure, policies, and user requirements that influence them. It may include: interviews with management, O&M personnel and service contractors, a review of equipment condition, building documentation, and service contracts, and spot tests of equipment and controls, and trend or data logging of critical data points (temperatures, pressures, electrical, etc.) over time, Sapp (2015).



## **PHP Hypertext Pre-processor**

Originally created by Rasmus Lerdorf in 1995, the reference implementation of PHP is now produced by the PHP Group. While PHP originally stood for Personal Home Page, it now stands for PHP: Hypertext Pre-processor, a recursive acronym. PHP is a server-side scripting language designed for web development but also used as a general purpose programming language. PHP is now installed on more than 244 million websites and 2.1 million web servers. PHP code is interpreted by web server with a PHP processor module, which generates the resulting web page: PHP commands can be embedded directly to an HTML source document rather than calling external file to process data. It has also evolved to include a command-line interface capability and can be used in standalone graphical applications. PHP is free software released under the PHP License. PHP can be deployed on most web servers and also as a standalone shell on almost every operating system and platform, free of charge.



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