Development of an Office TPM for Lecturer's Room

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ABSTRACT

This project is performed to develop an office TPM. The development of the Office TPM has been proved as a good approach while improving working system. Lecturers' rooms at Faculty of Manufacturing Engineering, Universiti Teknikal Malaysia Melaka (UTeM) were selected for data gathering. Observation and interview were used in this project. The respondents of this project involved lecturers and students. For the development of an office TPM, a lecturer's room was selected. 5S was used as the main approach in the development of the office TPM. The results from the development of office TPM were positively response to staff and students which directly use the lecturer's room. It will use as a benchmark lecturer's room for office TPM towards excellent working system.

KEYWORDS: *Total Productive Maintenance (TPM), 5S, TPM Office*

1.0 INTRODUCTION

TPM can improve the technological base of a company by enhancing equipment technology and improving the skill of employees. Furthermore, TPM helps to improve the organization's capabilities by enhancing the problem-solving skills of individuals and enabling learning across various functional areas [1]. TPM can be considered as the medical science of machines. TPM is a maintenance program which involves a newly defined concept for maintaining plants and equipment. The goal of the TPM program is to markedly increase production while, at the same time, increasing employee morale and job satisfaction [2]

According to Nakajima [3], TPM is a maintenance system which covers the entire life of equipment in every division including planning, manufacturing, and maintenance. It describes a synergistic relationship among all organizational functions, but particularly between production and maintenance, for continuous improvement of product quality, operational efficiency, capacity assurance and safety. The word 'total' in TPM has three meanings:

1. *Total Effectiveness*: indicates TPM's pursuit of economic efficiency and profitability.
2. *Total Maintenance System:* includes Maintenance Prevention (MP) and Maintainability Improvement (MI), as well as PM. Basically, this refers to "maintenance-free" design through the incorporation of reliability, maintainability, and supportability characteristics into the equipment design.
3. *Total Participation*: of all employees includes Autonomous Maintenance (AM) by operators through small group activities. Essentially, maintenance is accomplished through a 'team' effort, with the operator being held responsible for the ultimate care of his/her equipment.

The originators of JIT and TPM said that there is nothing earth-shattering about TPM. It is a sub-set of *gemba kanri* (workshop management), using a people-oriented approach to resolve maintenance and reliability problem at source [4]. TPM is a method for bringing about change. It is a set of standard activities that can lead to improve management of plant assets when properly performed by individuals and teams. TPM is a comprehensive strategy that supports the purpose of equipment improvement to maximize its efficiency and product quality. Ahmed *et al*. [5] define TPM is a proactive maintenance philosophy that brings a radical departure from corrective maintenance (fix it when it breaks). It aims to reduce failures, setup losses and other causes of poor or reduced production by involving the operators in the maintenance of their respective machines, which is a requirement of TQM application. TPM describes a synergistic relationship among all organizational functions, but particularly between production and maintenance, for continuous improvement of product quality, operational efficiency, capacity assurance and safety.

TPM is a maintenance system set-up to eliminate barriers to and losses in production. TPM identifies production losses and uses production operator teams to solve the problems causing the waste [6]. TPM is a low-cost people-intensive system for maximizing equipment effectiveness by involving the entire company in a preventive maintenance program. TPM is enabling tool to maximize the effectiveness of equipment by setting and maintaining the optimum relationship between people and machine. TPM not only leads to increase in efficiency and effectiveness of manufacturing systems, measured in terms of OEE index, by reducing the wastages but also prepares the plant to meet the challenges put forward by globally competing economies to achieve world class manufacturing (WCM) status [7]. Ferrari *et al.* [1] analyze that from a general point of view can underline some TPM targets and benefits:

1. Maximum efficiency of the plant;
2. An accurate definition of the plan for preventive maintenance;
3. A diffusion of relevance of maintenance;
4. Diffusion of workers' participation, at any level;
5. Development of management participation in problems by implementation of small groups.

Office TPM is one of the main eights pillars to support the implementation of TPM [2]. Office TPM is important to ensure the documents in proper arrangement while improving job environment and job efficiency in the office area. 5S is applied for development of the office TPM. the rational of 5S application is to develop step by step process for office TPM. The 5S system is the workplace organization method that improves the efficiency and the management of an operational area while improving morale and saving time. It stands for Sort, Set in Order, Shine, Standardize and Sustain [8]. 5S is actually a management tool from Japan, which focuses on establishing a quality environment in the organization, ensuring adherence to standards and in the process, fosters the spirit of continual improvement [9].

2.0 METHODOLOGY

This project was conducted at Faculty of Manufacturing Engineering, Universiti Teknikal Malaysia Melaka (UTeM) lecturer's room. Lecturer's room was selected because most of working time, a lecturer was spent at least 7 to 8 hours in the room. In addition, a lecturer especially have to do many kind of jobs included lecture note preparation, paper work preparation, literature review, assessment scheme for students, filling system, discussion, academic counseling, etc. The lecturer room must have a good condition in any perspective included data management, office layout, equipment set up, stationery management, labeling, ergonomic and etc. In this project, the authors considered that a lecturer must prepare him / herself the best condition of lecturer room to students and at the same time increase working efficiency with no error.

A selected lecturer's room was selected for case study. It used as a benchmarking lecturer's room for all staff. In the other hand, it will guide to other staff to identify what kind of improvement can be made by referring the benchmarked room. The selection of the lecturer's room is considered for two years experience lecturer with normal workload as an academician. Generally, a lecturer is responsible to prepare lecture notes, lab activities, case study, test, final exam and so on for students, perform research and development project, supervise at least 6-7 final year students project, writing up paper work for conference, review student report of industrial training program, and etc. Lecturer has to face a lot of documentation works and deal many people in working duration. Besides, a lecturer is required to alert any urgent activities include meeting, discussion, appointment, and so on. In addition, a lecturer also have to manage the wastes including used paper, old report, in-out documents, and so on in order to have a excellent working condition in the lecturer's room.

Figure 1 shows the basic layout for all lecturers' rooms. Every room generally have been provided one set of desk (L shape) with small drawer, small moveable drawer, three cupboards, three chairs (one for lecturer and the rest for guest (students)), a white board and a soft board. The room has at least three sockets (power point), one network point and one telephone point which located near to desk.

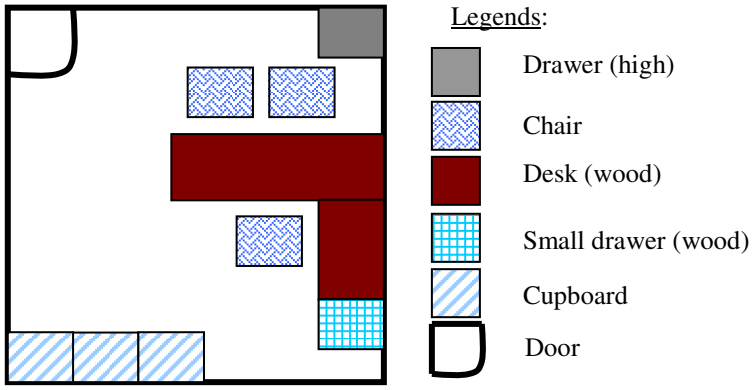

Figure 1: Basic Layout for Lecturer's Room

3.0 DATA COLLECTION

Data is needed in the development of Office TPM system at Lecturer's Room. Several methods were used to ensure the data are valid and relevant. Interview and direct observation are the two major methods for data collection. A few questions have been arisen and asked to the lecturers and students which considered the most highly rate use the Lecturer's Room. In addition, some of the lecturer used the Lecturer's Room for discussion and meeting with suppliers. Direct observation involved document arrangement, room's layout, environment, waste management, and etc. Below are the questions for interview.

1. Are you satisfied with the current room's condition?
2. Do you have any experience of difficulty to find your own documents or misplaced the documents in this room?
3. What kind of problem occurred in this room in terms of document arrangement, layout, environment, waste management (used paper) and etc?
4. Any complaints from students or other lecturers about this room?
5. How do you manage the documents?
6. Any other related issues in terms of office maintenance to share?

4.0 RESULT AND DISCUSSION

From data gathering, the authors found that from out of total 20 lecturers and 30 students, 80% of them were declared not satisfied with the lecturer's room. In addition, 70% students unsatisfied with their lecturer because of misplaced report in the lecturer's room. Regarding to document management, 70% of lecturers stated that they do not have time to do document management. Time constraint for them is the enemy. In addition, they do not know what should be to do in order to have well document management. 90% of lecturers stated that they also have problem in managing waste / used paper by sorting the non value added thing in their room. Sometime, they got trouble to determine what kind of document or else are the wastes / non value added thing in the rooms. In terms of environment, 60% of lecturers claimed that they unsatisfied with air-conditioner because sometime it becomes too cool and too hot. In addition, when in heavy rain, the water has gone through the room and a few documents were damaged in the rooms. Besides, 25% of lecturers having experienced with condition which the tiles in the room are blow up. When the problem is happen, the dust will produce and the room environment is became too bad and not good for health. The action to overcome the problem takes at least one week. One week is considered too long and spoils the lecturer activities in the room.

5.1 STEP-BY-STEP IMPLEMENTATION OF AN OFFICE TPM

The project was applied 5S concept in the development of an Office TPM. The following subtitle will elaborate the step-by-step implementation of 5S towards Office TPM.

5.1.1 STEP 1: SORT

In this stage, the author was identified the opportunities which potentially can be improved. This stage was covered the filling management, document arrangement, inside drawer layout, notice board management, in-out documents, wastes (including used paper, unused documents, etc), labeling system, floor, cupboards arrangement, overall office furniture layout, lamp control system, etc.

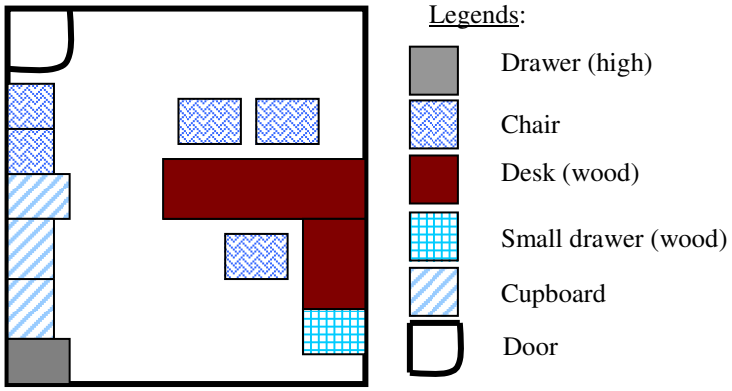

Figure 2: New Layout for Lecturer's Room

Figure 2 shows the new layout of lecturer room with furniture. Base on the origin layout, only cupboards and a high drawer have been changed. The rational of the changing is to make the lecturer's room look bigger. Besides, it believes to avoid people (especially students) to enter the back desk area. In addition, two additional chairs were placed at the lecturer's room for waiting time.

According to observations, it shows that no systematic approach or management system to manage files and documents through files. Besides, lecturers are also difficult to find the documents and sometimes it takes longer time. One of the lecturers favourite reason is does not have time. The authors disagree with the statement and believe on the solution.

5.1.2 STEP 2: SET-IN-ORDER

After sorting activities were performed in the first stage, the authors were continued with set-in-order activities. In this stage, the authors had bought several of office stationery materials for labelling, filling, and so on. The materials are very important and support the process of set-in-order.

From the result of literature review and interview, the author was tried to develop ideas for labelling, cupboards layout, internal drawer layout, filling system and so on. By having the labelling, the lecturer do no have problem to on or off the lamp without mistake. The labelling system helped the lecturer to identify the teaching equipments and optimize space of drawer usage. All the folders have titles, and numbering system was used to differentiate the document. Besides, the colour code was used to separate the highly use document (green), medium use document (blue), and rarely use documents (purple).

The notice board was developed to highlight the latest issues or knowledge to students. The notice board was labelled as Notice Board and General (focused on the general issues of teaching activities). A cupboard was used as a separator between lecturer and students area. In addition, the working area look bigger compared to origin layout. Through interview with students, almost of them were satisfied with the arrangement and happy to have discussion in the lecturer's room.

5.1.3 STEP 3: SHINE

The third step is shine. Shine means wastes elimination through eliminating the observed or hidden non-value added object, documents, activities, and so on. This is very important for documents finding and prevent the documents from damage or misplaced. In addition, the room condition will give a convenient condition for guest which involved student and other people. When it happens, the discussion, meeting or conversation can be performed in proper condition and will generate more idea without any disturbance from room's condition itself.

5.1.4 STEP 4: STANDARDIZATION

This step is focused on the development of standardization elements in any process of development of an office TPM. It covered the labeling system which included colour, font type, font size, background, map and so on. In the other word, the standardization step also called theme of project. At the future, the theme must be followed to avoid confusion and to prevent any mistake of misplaced.

5.1.5 STEP 5: SUSTAIN.

The sustain step is an approach for lecturer especially to maintain what have been improved in his / her office. The sound is simple but the implementation is too difficult. To create a habit, a lecturer must have a very good self-motivation and have a spirit to love improvement activity. For TPM, he / she should be a role model and always encourage others to do improvement.

6.0 CONCLUSIONS

As conclusions, office TPM was offered many benefits to administration work and management. It's generated the discipline on managing equipment in proper ways and courage of doing thing better. As a result, work became more effective and the equipment usage became more longer with minimum error. The challenges are included to sustain the program to go with the best ways of office condition related to time and working load.

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