

Effective maintenance engineering and management in packaging industry

Suhairi Ahmad*, Hashimi Lazim and Mohamad Salahudin Mohamad Saad

Department of Mechanical Engineering, Politeknik Tuanku Syed Sirajuddin,
Pauh Putra, 02600 Arau, Perlis, Malaysia

*Corresponding e-mail: suhairi.ahmad@gmail.com

Keywords: maintenance; packaging

ABSTRACT–The purpose of this paper is to investigate the maintenance needed in packaging industry and provide suggestions to overcome the breakdown time and prevent for any major losses. Therefore, the paper contains of maintenance organization, maintenance strategy, system approach to maintenance, maintenance planning and scheduling and the computerized maintenance management system suitable for packaging industry. Basically, the first thing needs to be consider is the organizations to stimulate the company and organize the maintenance well. Then, task is brought to next step which is choosing the right strategy to implement into the company and with the strategy, comes the system approach to maintenance which will be needed the organize/secure planning and scheduling. Computer system is when everything kept in place and secure and in that particular application one's company can be mire organized toward a better maintenance.

1. INTRODUCTION

Packaging today is applied to a wide variety of products, using such advanced technologies. Packaging can be described as a coordinated system of preparing goods for transport, warehousing, logistics, sale, and end use. Packaging contains, protects, preserves, transports, informs, and sells. Chosen industry for this study is Boh Plantation Sdn. Bhd. which is located at Brinchang, Pahang. Boh Plantation has become the one local of the world's few 'vertically integrated' tea companies with operations ranging from growing, picking, processing, packaging and marketing tea.

Maintenance is one of the major activities in packaging as it highly influences production quality and quantity and directly affects production cost and customer satisfaction. various packaging systems are introduced along with their distinctive features that influence maintenance strategies and practices. Maintenances management concepts, philosophies, policies, and practices in packaging are briefly described and discussed in this paper.

Effective maintenance engineering and management is an orderly and systematic approach of administrative, financial and technical framework for accessing, planning, organizing, monitoring and their cost on a continual basis. Maintenance in its narrow meaning includes all activities related to maintaining a certain level of availability and reliability of the system and its components and its ability to perform at a standard level of quality. It includes activities related to maintaining spare part inventory, human resources and risk

management. In a broader sense, it includes all decisions at all levels of the organization related to acquiring and maintaining high level of availability and reliability of its assets. In Figure 1.1 shows the main interactions of the packaging system.

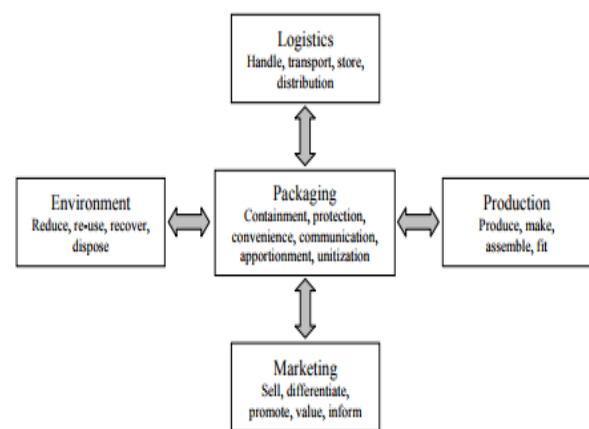


Figure 1.1 Types of packaging systems

In recent years, packaging design has developed into a complete and mature communication discipline. Clients now realize that packages can be a central and critical element in the development of an effective brand identity. The packaging system fulfils a complex series of functions, of which communication is only one. Ease of processing and handling, as well as transport, storage, protection, convenience, and re-use are all affected by packaging [1].

2. MAINTENANCE STRATEGY USED IN PACKAGING INDUSTRY

A good preventive maintenance program anticipates and prevents equipment failures such as doing periodic inspections, parts replacement and equipment cleaning. Automated equipment requires a targeted, routine preventive maintenance program to ensure proper operation and provide maximum in-service lifespan. An effective program involves a routine, systematic inspection, adjustment, lubrication and replacement of components, as well as software upgrades and performance testing and analysis.

Maintenance has been classified as follows: breakdown, routine, planned, preventive, predictive, corrective, design out maintenance, total productive maintenance and contracted out maintenance. Maintenance is primarily:

- to sustain equipment and facilities as designed, in a safe, effective operating condition;
- to ensure production targets are met economically and on time;
- to prevent unexpected breakdown of machinery and equipment
- to extend the useful life of equipment; and
- to ensure the safety of personnel using the system.

In order to maintain equipment, maintenance must carry out some further activities. These activities contain the planning of work, purchasing and control of materials, personnel management, and quality control. This variety of responsibilities and activities convert maintenance from a simple function to a complex function to manage. Maintenance should ensure equipment availability in order to produce products at the compulsory quantity and quality levels. The scope of maintenance management includes every phase in the life cycle of technical systems (plant, machinery, equipment, and facilities), specification, acquisition, planning, operation, performance evaluation, improvement, and disposal [2].

The need for reliability and dependability of equipment as well as compulsion to save cost in all areas are satisfied by these objectives.

3. IMPLEMENTATION OF SYSTEM APPROACH TO MAINTENANCE IN PACKAGING INDUSTRY

The maintenance improvement procedures, which represent the best practices to implement into the integrated management system.

Maintenance Management Process consisting of six phases:

- *Work identification*
Where information about performance indicators such as mean time between failures (MTBF), mean time to repair (MTTR) and overall equipment effectiveness (OEE) is defined.
- *Work planning*
That is, the identification of all required resources.
- *Work scheduling*
Where opportunistic maintenance tasks synchronized with production are developed
- *Work execution*
Where an effective control of the maintenance work execution function through clear accountability for each type of demand placed upon the organization is defined.
- *Maintenance history recording*
Which consists of evaluating and analysing the current programme in order to direct necessary refinements.
- *Maintenance analysing*
Which consists of identifying and investigating potential system (product or process) weaknesses.

4. EFFECTIVE MAINTENANCE PLANNING AND SCHEDULING SYSTEM

Effective Maintenance Planning and Scheduling will deliver a safer and more cost effective work environment for asset-intensive businesses. Scheduled Preventive Maintenance (PM) is a scheduled or fixed time maintenance service to detect and prevent potential failures and extend the life of equipment. It includes activities such as cleaning, lubricating, adjustment, and replacement of minor parts. It is used for reducing unexpected failure of critical equipment and to promote better safety, health and working environment conditions for the workforce. It helps in increasing the life span of assets and eliminates unnecessary replacements. However, PM should be planned and performed in a highly delicate manner to avoid damage of the equipment or nearby equipment during inspection, repair, adjustment, or installing or rein-stalling of parts.

Timing of PM should also be optimized to reduce risks of failure during or after PM and to minimize total costs of PM while maximizing total benefits. Computer and mathematical models are developed for that purpose. In general, the frequency of PM is determined by the type of equipment, its age, its condition, and the consequences of failure. Optimization models exist for various preventive maintenance policies including replacement and inspection [3].

5. CMMS SOFTWARE IN PACKAGING INDUSTRY

Computerized maintenance management system (CMMS) is the best guarantee that operation food safety regulations will be adhered to as the product moves through the logistical chain during processing, packaging, storage through distribution, and sale to the consumer.

For example, the basic food packing maintenance software is called *MAPCON Lite*. MAPCON Lite is a dynamic, full-featured food packaging maintenance management software at a cannot fail price. MAPCON Lite does the jobs to need without a lot of extra functionality your staff does not need

6. SUMMARY

This paper covered knowledge regarding maintenance of facilities and machine/equipment activities in good working condition and develops good maintenance management knowledge in the packaging industry.

REFERENCES

- [1] Visser E. Packaging on the web: an underused resource. *Design Management Journal* 2002; 62-67
- [2] M. Murray, K. Fletcher, J. Kennedy, P. Kohler, J. Chambers, and T. Ledwidge, "Capability assurance: a generic model of maintenance," in *Proceedings of the 2nd International Conference of Maintenance Societies*, pp. 1–5, Melbourne, Australia, 1996.

- [3] University of Johannesburg, Department of Mechanical and Industrial Engineering Technology, South Africa