

*Sudan University of Science and Technology*

*College of Engineering*

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B.Sc. in Biomedical Engineering*

**System of Preventive Maintenance**

**In Microbiology Department Equipment of National Laboratory  
for Public Health (STACK)**

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## **ABSTRACT**

The most critical problem facing the medical device is the downtime. One of the most common causes of medical devices' downtime is poor maintenance. For that problem daily check up for medical devices must be done as well as the Regular training on medical devices maintenance.

PM is regular, repetitive work done to keep equipment in good working order and to optimize its efficiency and accuracy. It Improve health care delivery, Keeps equipment in good condition to prevent large problems, Increases life of equipment, Reduces failures and breakdowns and Decreases cost of replacement.

Computerize maintenance system (CMS) has been developed to support personnel employed in health laboratories. Its purpose is to give a better understanding and usage of the technical requirements regarding installation, use and maintenance of various types of equipment which play an important role in performing diagnostic testing. The system also aims to provide support to personnel responsible for technical management, implementation of quality management and maintenance

For designing the system, first visit microbiology department have been visited and the biomedical engineers were asked about the current maintenance, then the windows of the system were designed on papers, after that the HTML language have been used to design the system.

CMS define the user about WHAT to do, WHEN to do and WHO is going to do any task also performs functions in support of management and tracking of engineers activities.

## المستخلص

من المشاكل التي تواجه الاجهزة الطبية وتحد من فعاليتها ان يقل العمر الافتراضي للجهاز لأداء وظيفته سواء ان كان جهاز تشخيصي او علاجي و نظرا للتكلفة الباهظة في تغيير قطع الغيار أو استجلاب أجهزة جديدة فمن البديهي أن تتم المحافظة على تلك المكونات من جميع المؤثرات التي تؤدي إلى تلفها أو إنقاص عمرها الافتراضي .وتتم المحافظة على هذه المكونات بإجراء عمليات الصيانة المخططة والمدروسة

الصيانة الوقائية هي مجموعة الفحوصات والخدمات التي تتم بصفة دورية وحسب خطة زمنية موضوعة قبل وقوع العطل أو التوقف عن العمل مما يساعد على المحافظة الدائمة على الحالة الجيدة للجهاز وضمان الأداء وبالتالي جودة الإنتاج.زيادة العمر الافتراضي للجهاز وبالتالي الحصول على عائد اقتصادي أكثر ,تحقيق ظروف تشغيل مستقرة والإقلال من حدوث الأعطال .

لابد أن يكون لدي إدارة الصيانة نظام كامل لتسجيل كل عمليات الصيانة بكل تفاصيلها الدقيقة التي تقوم بها خلال فترة عمر الجهاز .حيث أن المعلومات التي تسجل في هذا النظام هي التي تكون بمثابة المرجع الأول والأخير لتقارير الصيانة التي يتم رفعها للإدارة وتقدير الموازنات وخطة الصيانة وشراء قطع الغيار لذا المراقبة وغيرها من الأمور التنظيمية الأخرى.ينبغي الانتباه لدى وضع برنامج للصيانة الوقائية ، وهي ضرورة تتمتع هذا البرنامج بالديناميكية والمرونة اللازمتين وهذا يعني أن يتغير برنامج الصيانة الوقائية لالة ما بتغير ظروف عمل وتشغيل الآلة المراد صيانتها وقائياً

من أهم العناصر التي ترفع كفاءة عملية الصيانة للمعدات وخفض تكاليفها هو عنصر العمالة المدربة لأعمال الصيانة ، فبعد استحداث نظام الصيانة يكون على مسئول الصيانة تدريب وانتقاء الأفراد وتحديد المهام بصورة متخصصة وتدريبهم على استخدام نظام الصيانة المحوسب حتى يعمل النظام بكفاءة وفعالية وينعكس أثره على المستخدم والأجهزة.

لتنفيذ البرنامج تم اسنخدام اللغة المستخدمة لتصميم مواقع الانترنت لانها سهلة الاستخدام ومألوفة لدي المستخدمين وبعد تصميم النوافذ الخاصة بالبرنامج تم إدخال بيانات الأجهزة.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Project introduction:

Maintenance has a very important part to play during the life cycle of an item of device. It tries to maximize the performance of the device by ensuring that it operates regularly and efficiently, by attempting to prevent breakdowns or failures, and by minimizing the losses incurred by breakdowns or failures.

Reduce device's downtime as a result of scheduled preventative maintenance, increased device's life, ability to store historical records to assist in the planning and budgeting of maintenance and ability to generate maintenance reports.

A computerized maintenance system (CMS) is a type of management software that performs functions in support of management and tracking of engineers activities.

CMS systems automate most of the logistical functions performed by maintenance staff and management. CMS systems come with many options and have many advantages over manual maintenance tracking systems. Depending on the complexity of the system chosen, typical CMS functions may include the following:

- Work order generation, prioritization, and tracking by equipment/component.
- Historical tracking of all work orders generated which become storable by equipment, date, person responding, etc.
- Tracking of scheduled and unscheduled maintenance activities.
- Storing of maintenance procedures as well as all warranty information by component.
- Storing of all technical documentation or procedures by component.

Digital recording is one of the most basic benefits of using a digital system.

Maintenance (corrective or preventive) of healthcare equipment is not just a question of repairing broken things. It is an integral part of managing the whole lifecycle of equipment.

### 1.1 Project problem statement:

There is no organized preventive maintenance system in microbiology labs in Sudan.

### 1.2 Project objectives:

- Extends useful life of equipments.
- Reduces failures and breakdowns.
- Decreases cost of replacement.
- Keeps equipment in good condition.
- Improve health care delivery.

### **1.3 Project organization:**

Chapter one consist of introduction layout, problem statement and objective. Chapter two contains the theoretical back ground. The literature review described in chapter three. Chapter four deal with the methodology of data collection and system design. The results are describing in chapter five .chapter six deals with the discussion and also include conclusion. Chapter seven consists of reference.