Industrial Engineering Letters
ISSN 2224-6096 (print) ISSN 2225-0581 (online)
Vol 2, No.4, 2012

Computer Application for Maintenance Planning and Scheduling of Industrial Plant

AJAO, K. R[1]., ISSA, W. A.[2*], MOHAMMED, B. H.[3],
1. Department of Mechanical Engineering University of Ilorin
2. Department of Mechanical Engineering University of Ilorin
3. Amide Clay Industry, Ewekoro, Ogun, Nigeria
*Email: issaler2000@gmail.com

Abstract
Plant maintenance involves all activities carried out on a machine to ensure a zero downtime of operation. Maintenance activities vary from one industry to the other but the basic maintenance activities are mainly to ensure continuous operations of equipment, plant and machineries.
Over the past few decades, the various industrial work activities and maintenance operations are performed without a concrete plan (schedule) or are performed via manual paper work. Industrial operations are usually complex and recurrent activities. Analysis has shown that lack or insufficient maintenance coordination, has accounted for the poor performances and inefficiencies of many industries. Thus, it is pertinent to deduce a planned maintenance organizer or a computer aided design for the planning and scheduling of industrial work activities. This becomes important as computer has revolutionalized industrial activities with the development of modern high level computer programming languages such as visual basic by Microsoft among others.

1. Introduction

Plant maintenance involves all activities carried out on a machine to ensure a zero downtime of operation. It involves all activities carried out to prevent operation stoppages or downtimes in industries due to equipments and facilities failure or to minimize downtimes as much as possible.
Maintenance planning and scheduling is often viewed as the centre of industrial maintenance management, since other processes such as preventive maintenance, root cause analysis (RCA), inventories record management, and other processes are dependent on the planning and scheduling process to work.

1.1 Reasons for Planning and Scheduling Maintenance Operations:

- It enhances work efficiency since operations can be easily delegated among employees.
- It assures the optimum availability of installed equipment for production or service.
- It ensures operational readiness of all equipment required for emergency use at all times such as standby units, fire fighting, rescue units etc.
- It enhances maximum possible return on investment.
- It ensures the safety of personnel.

2. Design Analysis

The Program is design with the compiler, Microsoft Visual Studio 2008, version 9.0.21022.8 RTM © 2007, Microsoft Corporation. It is sectioned into modules. Each of the modules provides specific functions and features that when combined together, becomes an outstanding maintenance management system.

3. Function of Each Program Module

- THE LOGIN WINDOW

It controls the relative access of the engineer and other staffs as the engineer can access all the modules unlike the other staffs that have no access to the scheduler and the work permit.

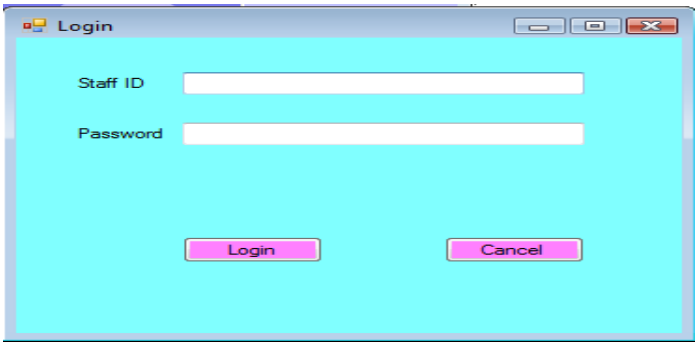


Figure 1: Login Interface

- HOME PAGE

The home page has buttons associated with the modules. It also has four separate data grid tables, showing a summary of the day's planned scheduled, equipments history, inventory records and work permit records. This is aimed at presenting a first hand view of activities to be performed and stock levels at the first look of the program.

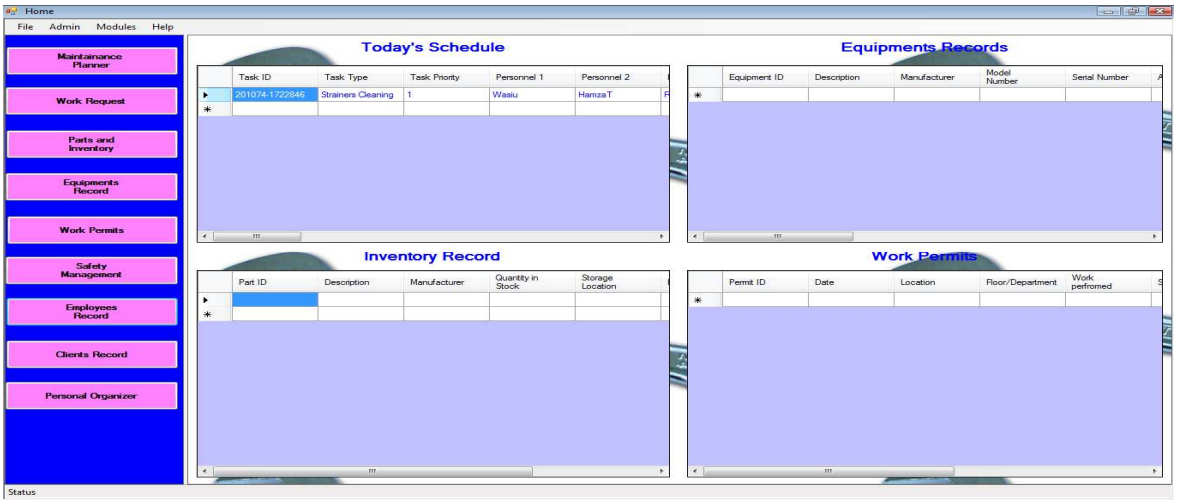


Figure 2: Home Page Interface

- MAINTENANCE PLANNER MODULE

This is used to create planned maintenance type tasks. The Engineer is able to schedule maintenance operations to be performed on plants through this module. Also, the personnel to carryout the maintenance operations and can likewise give appropriate safety instructions for successful performance through this module.

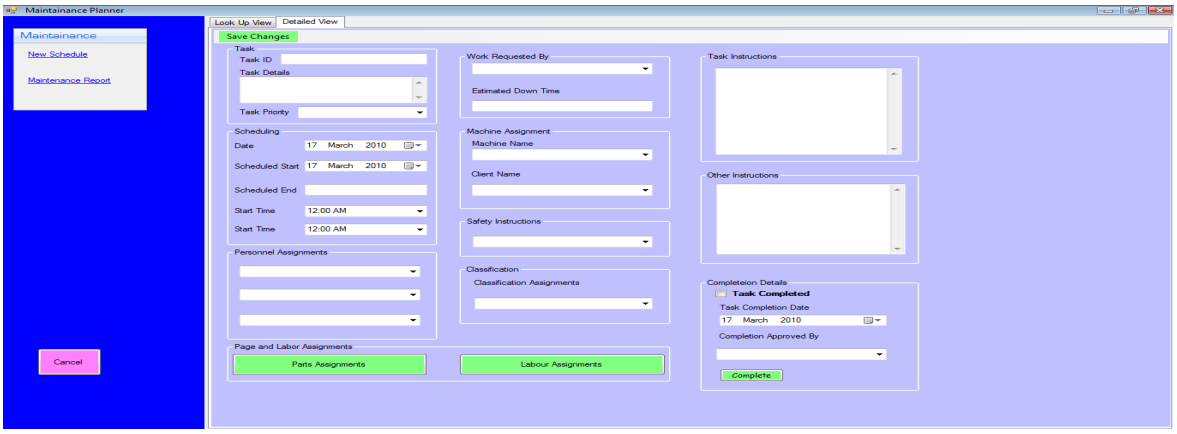


Figure 3: Maintenance Planner Module

Similarly, parts and labour required to carryout the task can be assigned through the parts and labour assignment button as shown above.

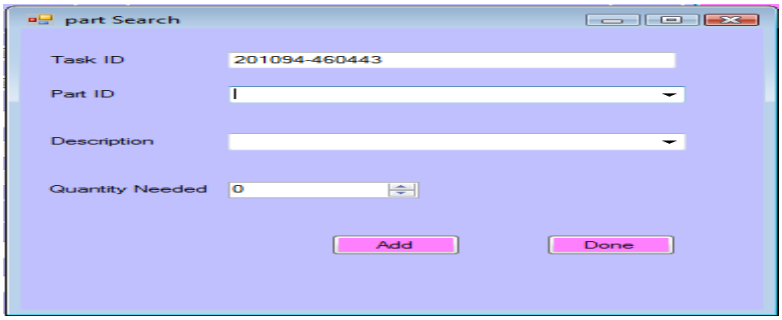
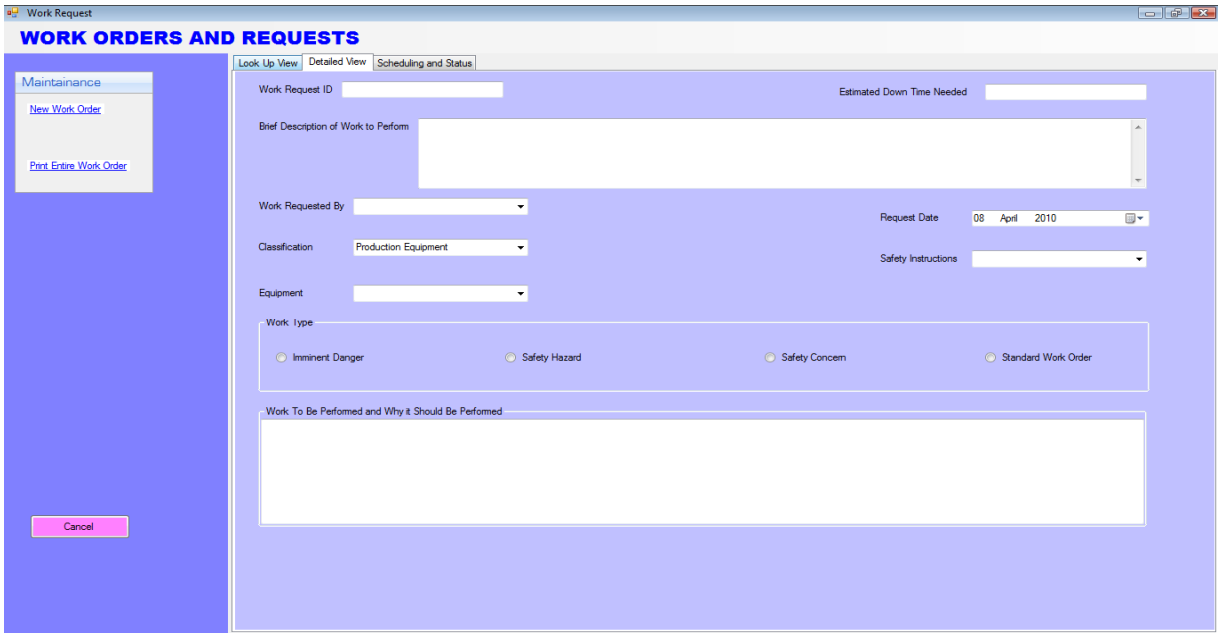


Figure 4: Add Part Interface

- WORK REQUEST MODULE



The work request often include elements that help the management to know exactly what the staffs wishes to order, including what work to embark upon, equipment required, scheduling and completion information among others.

Figure 5: Work Orders and Report Module

Details of completed work order will automatically save to the data grid table and can be printed when required.

(v) PARTS AND INVENTORY RECORDS MODULE

Here, part information such as description, manufacturer, part number, etc are recorded. It is also possible to setup stock levels for the inventory items as well as storage locations.

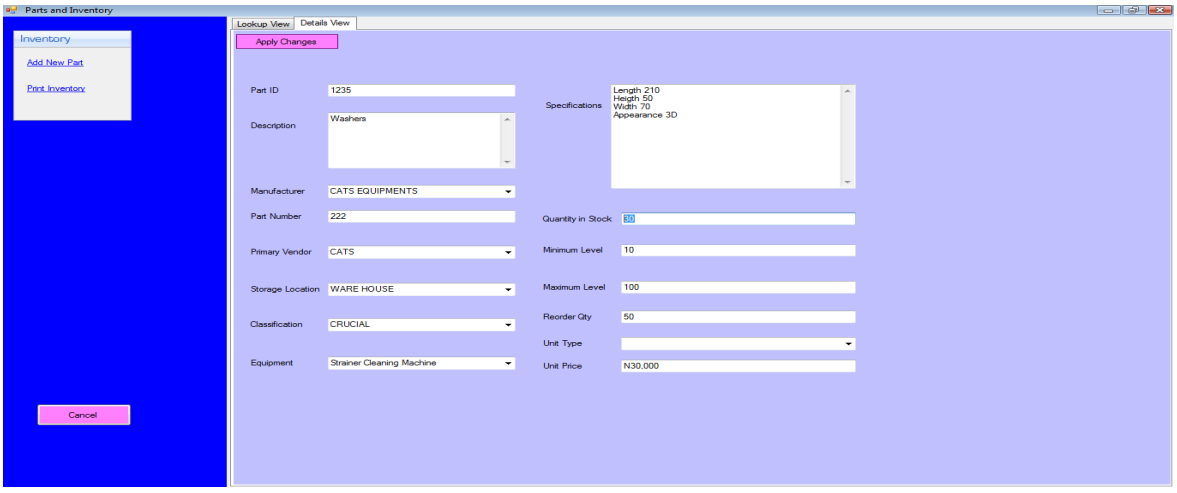


Figure 6: Parts and Inventory Module

- EQUIPMENTS RECORD MODULE

The Equipments Record Module is where information on equipments and other assets are recorded. Information such as asset numbers, warranty information, leasing information, etc, can be maintained.

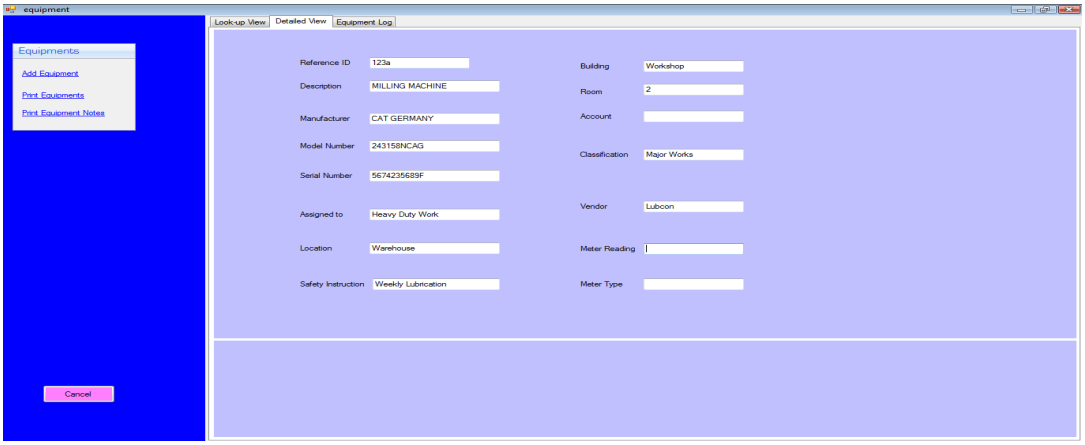


Figure 7: Equipments Record Module

- WORK PERMIT MODULE

The permit contains such information as permit identification, date issued, building where work is to the performed, permit expiration date and a column for management approval among others.

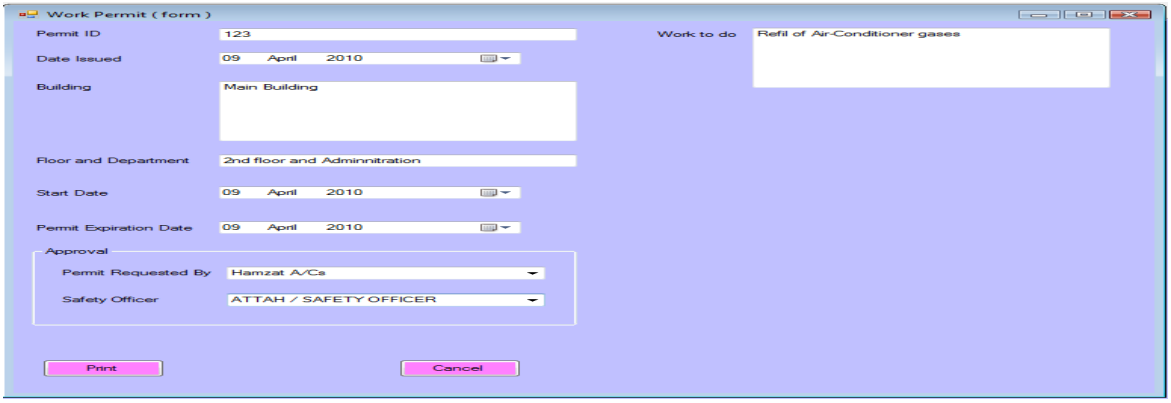


Figure 8: Work Permit Module

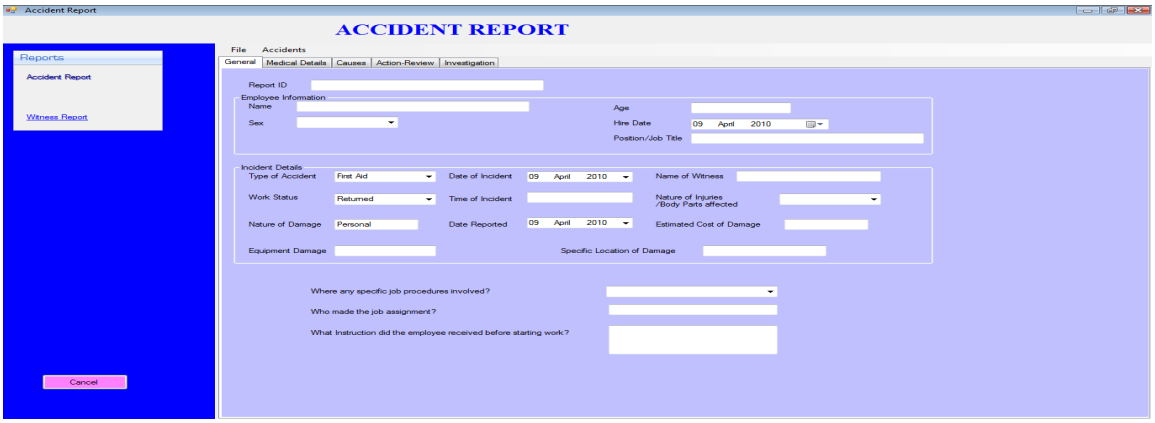


Figure 9: Accident Report

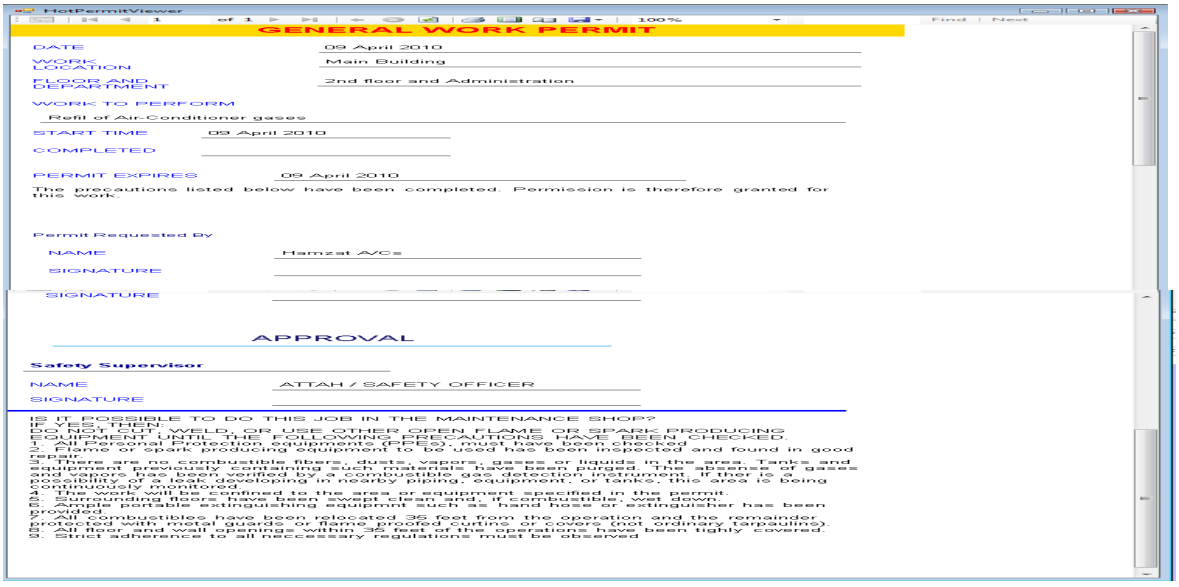


Figure 10: General Work Permit Report

- EMPLOYEES RECORD MODULE

Efficient maintenance planning also involves keeping an appropriate employee record. This information is properly documented in the database.

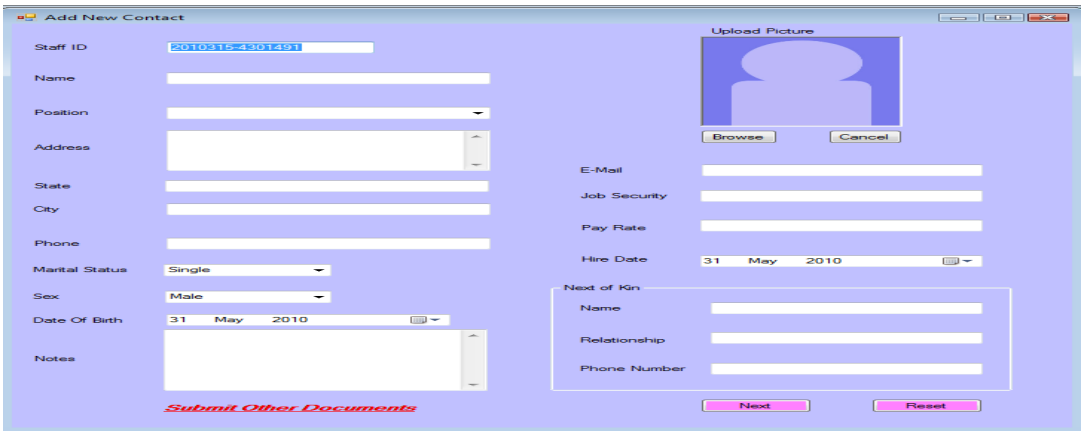


Figure 11: Employees' Contact Module

4. Conclusion

Effectively planning for future actions help in achieving goals in the most efficient and effective manner. It minimizes costs and reduces risk and missing opportunities. It can also increase the competitive edge of an organization.

References

Umar M. Al-Turk, (2009), Handbook of Maintenance Management and Engineering, Springer London, (accessed on 20/04/2010), Available online at http://SpringerLink-Book Chapter.htm

Maintenance planning and scheduling article, book and invent information, (accessed on 20/04/2010), Available online at
http://Maintenance planning and scheduling article, book and event information.htm

Maintenance software, (accessed on 10/11/2009), Available online at
http://www.bigfootcmms.com/product/features.html

Maintenance Coordinator, Simplicity Software Technologies Inc, (Accessed on 10/11/2009), Available online at http://www.cordinator/maintenance_coord.htm