The International Journal Of Engineering And Science (IJES)
|| Volume || 4 || Issue || 5 || Pages || PP.09-17 || 2015 ||
ISSN (e): 2319 – 1813 ISSN (p): 2319 – 1805

A Framework for Dead stock Management System for in-house computer engineering department

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----------**ABSTRACT**----------
Equipment management is an important issue for the safety and cost in an institute. In addition, the use of an efficient information system effectively promotes the processing performance. The maintenance of deadstock's information using paperwork is very difficult in terms of time. Deadstock management system to be used for in-house computer engineering department. The system is web based and uses intranet approach for communication between different users of the system. Through the related application, it has efficiently improved operation such as addition, modification and deletion of dead stock information. The system also generates report useful for arranging equipment's for different purpose like practical exam and workshops. System also sends notification to users for effective and consistence maintenance of data. The system can be used to improve the work quality, reduce the maintenance cost and promote the safety of all equipment.

INDEX TERMS- *Lab Incharge, Section Head, Admin, Report, mobile notification, CED.*

Date of Submission: 16-April-2015 Date of Accepted: 20-May-2015

I. INTRODUCTION

Today's IT Environment in various institutes and industries is highly dependent on various equipments. These various equipments must be kept in good condition to prevent from different injuries issues ofequipments for this purposeequipment management is one of the important elementsof quality management in institutes [2]. The different engineering departments in institutes are responsible for day-to-day management of moving and handling of equipments. Maintenance responsibilities may be also delegated to specific peoples [2].Within institutes, there should be clearly negotiated areas of responsibilities about who monitors the equipments and its use, who is responsible for carrying out routine checks, who is responsible for any repair or maintenance cost.For these goals,(Computer Engineering Department) CED is responsible for purchase assessment, safety installation, warranty assurance ,correcting repair, preventive maintenance, and identifying discard equipment, effective services and equipment that are necessary for different community services in institutes.[1].
The Equipment Management System is used for data collection and management. It incorporates the equipment inventory, the preventive maintenance schedules and all service history records.[1] Besides, it is also an administrative tool to track equipment, to initiate work orders, to obtain performance indicators of equipments, to determine equipment failure trends and to produce management reports. Proper management of the equipment in the laboratory is necessary to ensure accurate and timely testing [2].

This paper presents an information framework to build and to enhance CED on the equipment management capabilities in an institute. With this method, we will show a framework of equipment management system from system network architecture tothe relationships between each sub-system model. We will discuss how to use the information to improve the operation quality and to control the potential risk of equipments in institutes [1, 2].

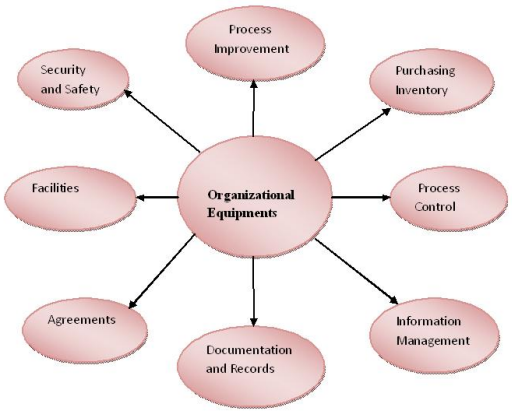

Fig 1.Responsibilities of Organization/Institute

II. BACKGROUND

In Each institute every department has the primary responsibility of care, maintenance, records and control of all property assigned to it [3]. It shall maintain up-to-date departmental records and initiate the appropriate actions to fully inform the institue authority about all transactions may be properly carried out.The department is also responsible for communicating with Purchase Officer for notification of loss, disposal [3].

Following are the benefits of a good equipment management system:

- Helps to maintain a high level of laboratory performance.
- Reduces variation in test results.
- lowers repair costs, as fewer repairs will be needed for a well-maintained instrument;
- Lengthens equipments life.
- Reduces interruption of services due to breakdowns and failures.
- increases safety for equipments.

In our institute all work of maintaining records of deadstock related to department done manually using paperwork which is very time consuming and complicated process,hence one can not able to tracefaults in earlier specifiedtime. We have developed a database driven equipment management system for lab members to obtain up to date information on the status and availability of tools from any web browser. The system displays whether a tool is up, down or in a caution state. In particular we point to following shortages:

1. *Time consumption:* Instead of maintaining records of deadstock using paperwork which is very time consuming process, records are maintained in database which allows secure and reliable transactions on data. Effective maintenance of data allows error tracking in time
2. *Lack of user perspective:*In collaborative Web application users should have different interaction experiences according to their role. For example,Sections heads are able to see records of equipments from all labs related to their section only.
3. *Lack of group communication:* This concept takes into consideration how different users interact with each other and it is very important for effective maintenance of data.

III. METHOD

The appropriate and efficient use of this system is related to proper functionality differentiation ofeach specific module and network architecture.

A. System Network Architecture

The system network architecture (Fig. 2) was designed under the consideration of data safety and work performance of equipments.This was divided into three parts. First, the intranet in department connects the overall operating computers of department. Purchase System sends some basic information of equipment (such as deadstock number, purchase date)to the departmental users such as section heads or lab incharges. Second,the architecture willincrease the work performance for the inner users of CED (Computer Engineering Department) in input or query data to Deadstock Management System. In addition the local network also includes a Web server of CED and a database. Third, the Web server of CED connects to the internet through a firewall and provides a service to inner users to communicate with themselves effectively.

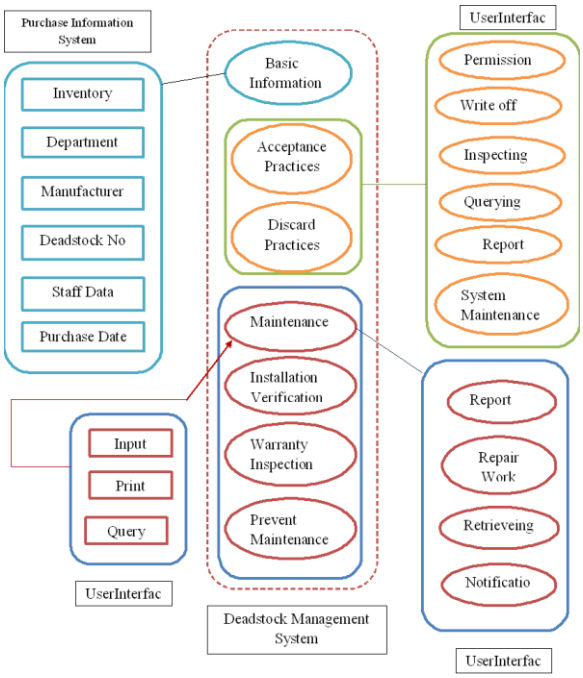

Fig 2 Relationship between modules of deadstock management system

B. The Deadstock Management System architecture

The Deadstock Management System,main elements shown in (fig 2),which contains seven elements, i.e basic information, acceptance practices, discard practices,maintenance practices, installation verification, warranty inspection, prevent maintenance. These elements were considered according to the operational activity of CED. On the basis of different operating attribution of department, they can be classified into four groups:

The first group is the basic information, which primarily provides fixed information to other elements in system such as inventory information, staff data, equipment maintenance vendors, user departments and their deadstock number. These data comes from Purchase Information System. Equipment tagging, tracking, and maintenance of campus equipment records are responsibilities of the Purchase Officer.This central administrative function is usually part of Property Accounting, Material Management. The application of the identification number i.e deadstock number to equipment is the responsibility of the Purchase Officer; this function may be delegated to a campus department by maintaining appropriate controls.When a user operates other sub-elements and inputs a key word, this related basic information will be loaded to an appropriate field. The mechanism will reduce the user operating time and increase the data correctness.

The second group related to administrator contains acceptance and discard practices. These practices focus on document assesment. The administrative staff needs to record the right date and time at different conditions such as write off equipments, inspecting, querying, report, and permission in service case. Besides, the date and time data will be automatically reloaded by the system when a user selects specific operation. Moreover, the administrator needs to key in the assessing results or data to the system. The history information of related equipment could also be queried by these sub-elements. The administrator needs to keep track of all equipments in different sections by generating consolidated report by considering individual section or all sections together.The maintenance function provides managing functionality for all sections in department

The third group is mainly related to different section heads in CED, i.e Hardware, Printer, Kit, Furniture, and Miscellaneous which aimed at equipment maintenance of respective sections and the repair work of CED, which is the busiest in deadstock management system for daily work. To section heads, its function are like send notification to administrator when the equipment has a breakdown ,their major works focus on inputting the data related to their respective sections by considering collaborative data from different labs to the system and send important notification to administrator. Besides, the section heads can query related statistics from the system to obtain performance indicators, to determine management reports based on monthly basis or duration basis or year wise reports which will be send to administrator for further verification.

The final group related to the Lab incharges in CED. It is responsibility of lab incharge to consider following parameters to achieve effective maintenance of data in lab:

- *Installation*—for new equipment, what are the installation requirements, and who will install the new instrument?
- *Calibration and performance evaluation*—what is needed to calibrate and validate that the equipment is operating correctly? How will these important procedures be conducted for both old and new instruments?
- *Maintenance*— will the laboratory need additional preventive maintenance.
- *Troubleshooting*—is there a clear procedure for troubleshooting for each instrument?
- *Service and repair*—what is the cost? Can the laboratory obtain the necessary service and repair?
- *Retiring and disposing of equipment*—What must be done todispose of oldequipment when it needs to be replaced

The attribution of the this group belongs to managing activities such as send notification to respective section heads when the equipment has a breakdown, inputting the data related to their respective laboratories to the system and sends an important notification to section heads and administrator via mobile notification scheme. Besides, the lab Incharges can query related statistics from the system to obtain performance indicators, to determine equipment failure trends, and to produce management reports based on monthly basis or duration basis or year wise reports which will be send to section heads for further verification. So, the system can highlights issue according to the important time point of predetermined schedule such as warranty expired e.g antivirus expiry date. This information can be triggered by lab incharges to print a work order. Besides, the lab incharge can also set and manage related equipment list and time schedule. To query by deadstock number, the user can easily get related information for certain equipment.Finally, the maintenance statistic function provides the information about the performance of equipments in respective labs.

C. Security

Security is of prime importance for Labs or sections, independently if they are accessible through the public Internet or a private network. Security consists basically of authentication and authorization. Usually, authentication consists of a challenge presented to the user. In its simpler form, the challenge is a request of a password. Usernames and password of each lab incharge and section head are stored into database by providing authorization to each user so that each lab incharge or section head can view information related to their respective lab or section.Once the user is successfully authenticated, it is said that the user has established a valid access session with the system. In web-based applications such as deadstock management system, a Hypertext Transfer Protocol (HTTP) session for a period of time. As long as the HTTP session is valid, the user is consideredauthenticated by the server.An HTTP session object maintains state about the session, including the user's credentials. A web-based authentication service can employ a database for storing the registered users and HTTP session objects holding information about the authenticated users.

Authorization is the process of checking whether an authenticated user is allowed to establish an interactive session with the system. This is usually based on access policies. An access policy condition checks many access parameters such as user's identity or username, password etc. An access policy action allows or denies the access to the resource. Authorization must also prevent a malicious user from bypassing this process and interacting directly with a service or resource. As an example, an access policy can state that administrative services may only be invoked by users holding administrative credentials. Each and every user in system is provided with forgot password option i.e whenever any user forgot their password he/she can doregistration with new password for further operations.

D. Developing tools

The developing tools are used for web page design and database building. First, the web pages of Deadstock Management System were designed by the HTML5, CSS3, Jquery and JavaScript, because the software is easy to get and easy to use. We have used JAVA for the programming, because the web page designed by JSP is more efficient in processing the complex operating environment. The application will be deployed on desktops with Linux operating system.

About the database tools, the MySQL server was adopted for local database of CED. The factors of selecting different databases were considered with the using volume, cost, performance and efficiency.

IV. RESULT

The user interface of Deadstock Management System is shown in Fig.3. The left side of the UI shows the working menu and the below is the brief description of system. It was designed by Jquery, JSP, HTML5 and users operate the function on their computer browser. Different roles (such as administrator, section heads and labincharge) have different authorities to open different functions.

Fig 3. User Interface of Deadstock Management System

Authentication for different users in system is provided through login form shown in Fig 4. Also, forgot password facility is provided to each and every user shown in Fig 5.

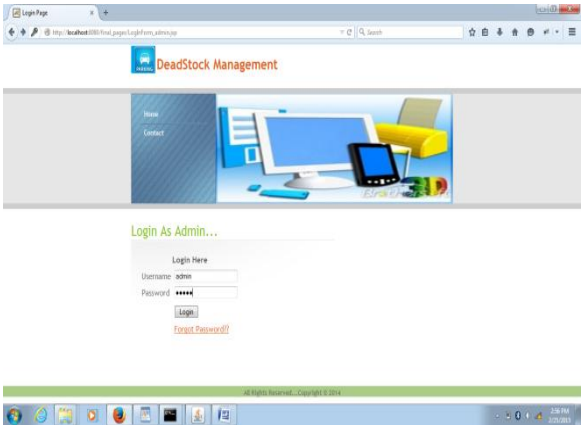

Fig 4 Authentication Login form

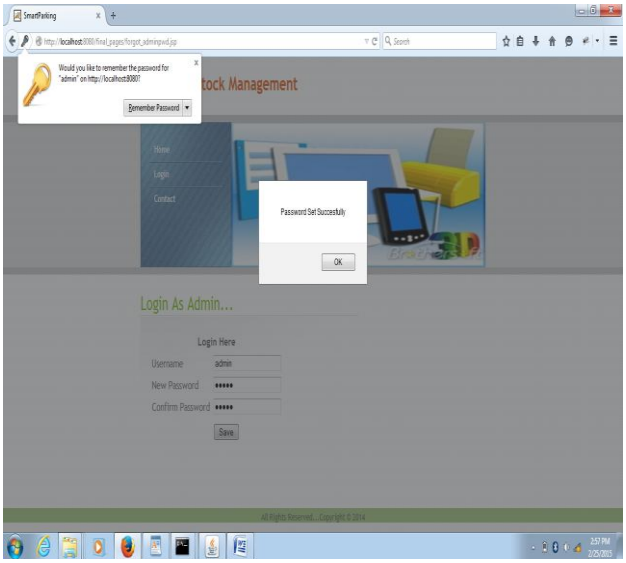

Fig 5. Forgot password form

In the maintenance data,we not only performed different operations on data such as insert new data,update existing data,update particular data, search particular data ,but also look into a general cause of the error conditions while performing all this operations on specific data shown in Fig 6.We can set specific field on the queryfunction of system to get related informationshown in Fig 7 and Fig 8.The information can be used to prevent maintenance schedule of deadstock in particular section or lab

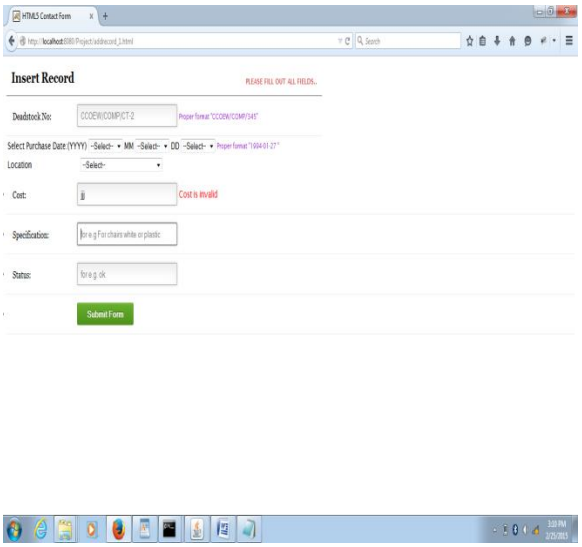

Fig 6 .Insert operation with validation

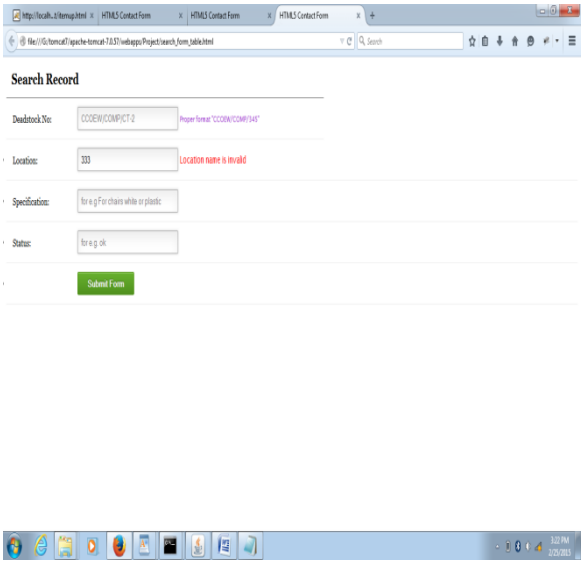

Fig 7. Query system to get related information

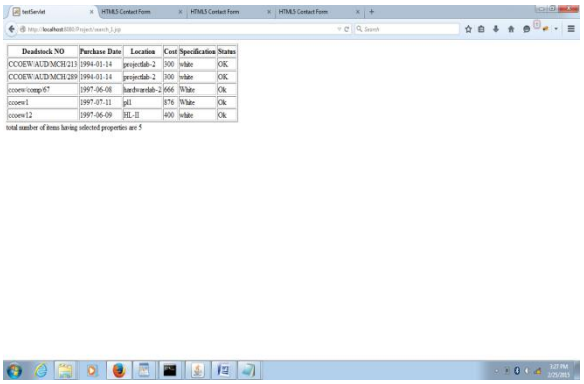

Fig 8. Result of Query function

Administrator is able to see record of all equipments. Admin is authorized to add and delete records related to deadstock.Lab Incharge maintains information about status of deadstock corresponding to their respective labs. Different Section Heads has right to update data into database without permission of administrator but notification will be send to admin.

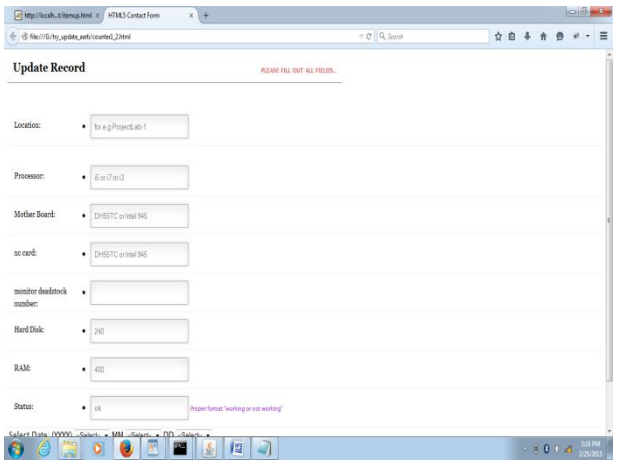

Fig 9.Update operation on data

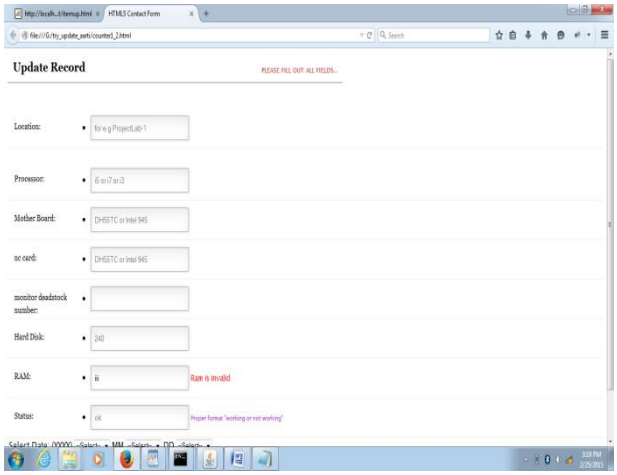

Fig 10.Update operation on data with validation

Every section head and lab incharge has to maintain data related to their section or lab in fixed format, by considering all attributes ofdeadstock in their respective section or lab. There are total five sections in department. From which Information related to hardware equipments i.e CPU or monitor is maintained by all lab incharges in department is shown in Fig 11.

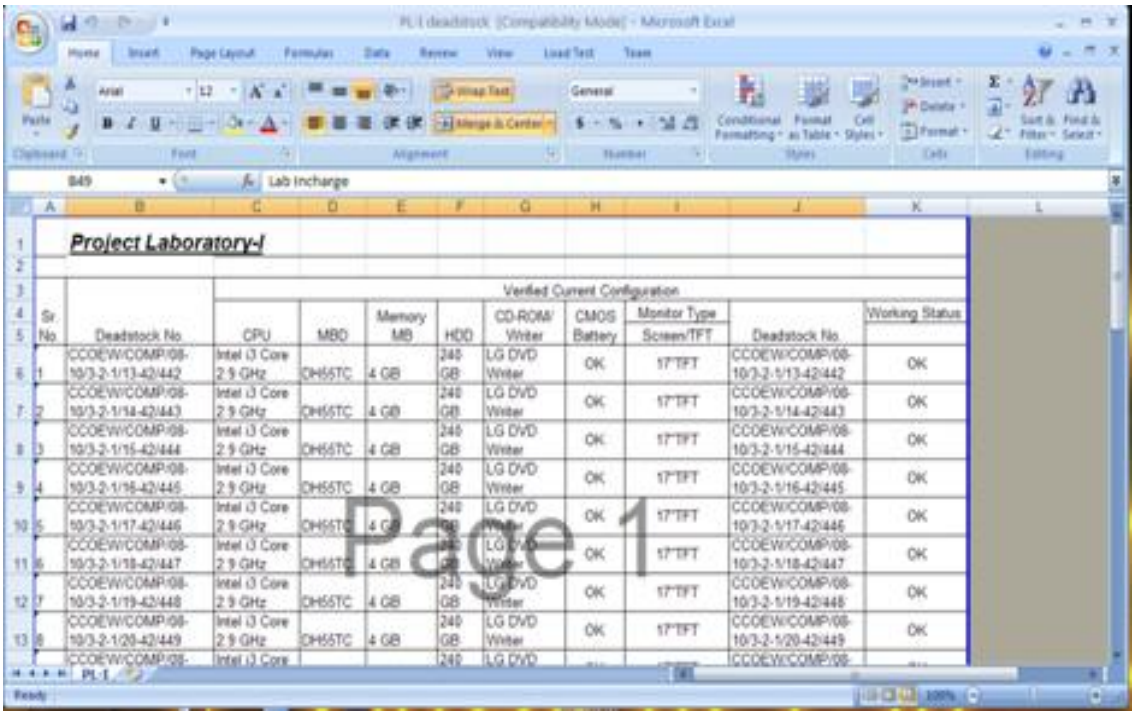

Fig 11.Lab wise data information maintained by lab incharge

Finally, system generates management reports based on monthly basis or duration basis or year basis for section heads or lab incharges which will be send to administrator for further verification is shown in Fig 12.Some standard reports and their users shown in Table 1.

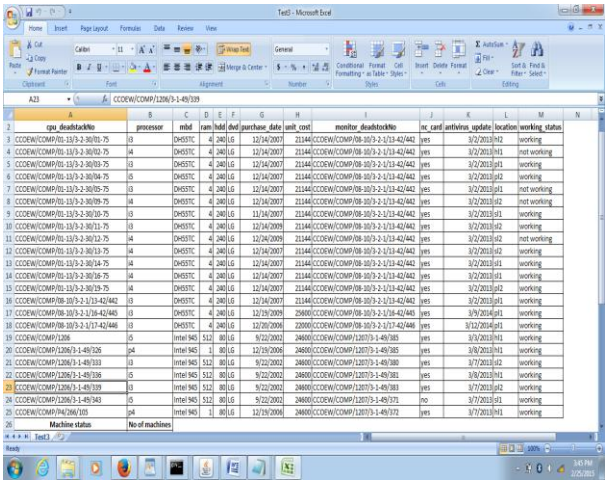

Fig 12.Report format

Report	Users
Device related maintenance data	Lab Incharge
Section related report	Section Head
Combined report of all sections	Administrator

Table 1.Standard Reports and their Users

Our results demonstrated the ability of data analysis for maintenance history records with system. It just uses the available data of the department in all operating activities of CED. It revealed a major problem that the information about equipment was too old to be maintained using paperwork and faults in equipments or data are track in earlier time.

V. CONCLUSION AND FUTURE WORK

A good equipment maintenance program result in high level performance and greater reliability of results.It is essential that good documents and records be maintained. These will include acomplete and accurate inventory of all laboratory equipment, documents provided by different section heads or lab incharges, maintenance, andtroubleshooting, and recordsof all preventive maintenance and repair activities.[2].

We have developed deadstock management system which is suitable for various purposes such as it provides a proper, faster and cost effective service to users thus reducing the time required to maintain records of equipments, equipment and CED management. This system for management of equipment and the computer engineering department is flexibleand reliable. The user interface is pleasant and comfortable. Data input is easy and quick. Fixed report modes make it possible to get desirable and reliableinformation rapidly and simply. The deadstock management system designed to fulfill the requirements of computer engineering department management.

For future work directions, we can include more mobile based solutions to develop system. As system is developed for particular department in institute,in future system can be developed for other departments in institute and database can be centralized with other departments in institute.

REFERENCES

[1] Chia-Hung Chien*, Yi-You Huang, and Fok-Ching Chong ,"*A framework of medical equipment management system for in-house clinical engineering department"*, Engineering in Medicine and Biology Society (EMBC), 2010 Annual International Conference of the IEEE

[2] http://www.who.int/ihr/training/laboratory_quality/3_b_content_equipment.pdf

[3] http://foa.calstate.edu/pdf/equipment.pdf

[4] Ryan Taylor, "*Web-Based Content Management System for Equipment Information"*, Utah Nanofab, College of Engineering, University of Utah.

[5] Toderick, L., Mohammed, T., Tabrizi, M.H.N."*A Reservation And Equipment management system for Secure Hands-on Remote Labs for Information Technology Students*", Frontiers in education, 2005,FIE '05Proceedings 35th Annual Conference.

[6] Mario A. Bochicchio, Member, IEEE, and Antonella Longo, "*Hands –On Remote Labs: Collaborative Web Laboratories as a Case Study for IT Engineering Students*",IEEE Learning Transactions, vol 2,no 4,October-December 2009.

[7] Eliane G. Guimara˜ es, Eleri Cardozo, Daniel H. Moraes, and Paulo R. Coelho, " *Design and Implementation Issues for Modern Remote Laboratories*", IEEE Learning Transactions,vol 4,no 2,April-June 2011

[8] ArjaIlomaki, Pekka Karp, Seppo Savikurki, louko Kiiveri, "*A New Information System for the Management of Medical Equipment and The Clinical Engineering Department*", vol 3, 1992 14th Annual International Conference of the IEEE