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Web Based Application for Maintaining Industrial Machinery Tools Usage with Service Notification

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***Abstract*- Every tool that are being used in industries has a cycle life time that estimates the total life of the machinery. To track this life time, industry records every usage cycle of its tools in a hand written form known as tool history. The service period of the tools should also be tracked to avoid any malfunction. There may exist a chance that the data can either be lost or erroneous due to manual handling of data. This project proposes the maintenance of industrial machinery tools usage with a web based application that calculates the lifetime of tools with real time manual data entry. Web based application is a kind of software that runs on a web browser. It is created with programming languages such as HTML, CSS, JavaScript and PHP that are supported by web browsers. Web based applications use client server architecture and hence more powerful and secure. The languages that are used in web based applications are open source and therefore no licensing is necessary. The proposed application can also provide periodical notifications to intimate service period of tools. Separate privileges for every user can be set or modified. The application runs on a main server and can be accessed by any of the client systems connected to it. The application is secured with proper encryption algorithms such as md5, sha1 and authentication to prevent any misuse. Its session tracking provides more flexibility to track user login and operation details.**

***Index Terms*: tool, maintenance, life cycle, mould, session, and lifetime.**

I. Introduction

Every industry uses tools to complete their tasks. These tools should be maintained periodically to ensure their proper working. Tracking this maintenance period becomes a crucial task for the labors since they will be busy in machine operation. The proposed software takes the complete tool management process in a computerised form.

Setup Changeover System:
In this process the industry might wish to change some of the properties or entire design of the already existing mould. To accomplish this change, the company requests the manufacturer to make the required changes. The changes to be made are specified as drawings and content and is often sent by the representative directly. Once the changes are made by the manufacturer, it is sent to the company for approval. The quality control checks for the changes and notifies the manufacturer if any exist.

New tool validation:
In this process, the industry designs a new mould which is yet to be built for production. A test mould is manufactured by the manufacturer and it is sent to the company for testing. The company checks for the mould and performs a test run. After proper validation, the tool is sent to manufacturer for production.

Tool Improvement:
In this process, the mould which already existing is updated and improved. Improvement process is of two kinds - PROACTIVE AND REACTIVE. After this, the tool is validated.

Tool Maintenance:
After continuous usage of a moulds, maintenance has to be done at some particular cycle values. Maintenance ensures proper running of the mould. It is of 3 types. Routine, Preventive and condition based. Routine maintenance is done at every 2000 cycle interval. It is a general type maintenance. Preventive maintenance is done at every 3000 cycle interval. It ensures that the mould cavities are of proper dimensions. Condition based maintenance is done at certain miscellaneous conditions such as mould breakage, repair and so on.

Tool breakdown Maintenance:
It is a special type maintenance which is done once the mould has been broken down. It is the most time consuming maintenance.
All the above processes needs the tool history card to be updated. The tool history card consists of the complete details about the tools and their up to date working log. It can be used to track the maintenance schedule and ensure proper working of the mould
.

GOAL OF THE WORK

The process takes the complete tool management process in computerised form. The main goal of the application is to manage the tool history process that provides notification triggers before the schedule. It can also perform cavity testing of the moulds. Cavity testing can be performed for both width wise and height wise. It can also provide the usage and maintenance processes in a graphical form. Graphs can be both year wise and month wise. To maintain industrial privacy, separate login privileges has been given to every user and access to pages has been restricted. Complete tool details can be maintained in the system

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II. RELATED WORK

2.1. THE INDUSTRIAL MAINTENANCE MANAGEMENT AND IMPLEMENTING MAINTENANCEPOLICIES FOR IMPROVEMENT IN PRODUCTIVITY

2.1.1 Introduction

Maintenance[1] is defined as the combination of all technical, administrative and managerial actions during the life cycle of an item intended to retain it in, or restore it to, a state in which it can perform the required function. In the same standards, maintenance management is defined as all the activities of the management that determine the maintenance objectives or priorities, strategies, and responsibilities and implement them by means such as maintenance planning, maintenance control and supervision, and several improving the methods including economic aspects in the organization. The maintenance management policy[2] can be viewed as one of the basic and integral parts of the maintenance management function. The maintenance management function consists of planning, organizing, implementing and controlling maintenance activities. The management organizes, provides resources (personnel, capital, assets, material and hardware, etc.) and leads to performing tasks and accomplishing targets. Once the plans are created, the management's task is to ensure that they are carried out in an effective and efficient manner. Having a clear mission, strategy, and objectives facilitated by a corporate culture, organizing starts the process of implementation by clarifying job and working relations.

2.1.2 Maintenance Management Policy

It is generally accepted that, in any maintenance department where there are more than 10 crafts persons and more than two or three crafts, some planning, other than day to day allocation of work by supervisor or leadsperson, can result in improved efficiency. As the size of the maintenance organization, for example, scheduling[3], increases, the extent to which work planning can be formalized and the amount of time that should be spent on this activity are increased. There should be only as much planning as necessary for maximum overall efficiency so long as the system costs less than the cost of operating without it.

2.1.3 The Procedure for Scheduling

There are practical limitations to any scheduling[4] system. A very detailed schedule that because of emergencies becomes obsolete after the first hour or two of use is of little value. If, however, actual performance indicates from 60 to 80 percent adherence during normal operation, the value of the schedule is real. Justification of any scheduling system requires proof of its effectiveness in dollars saved. Where some form of incentive system or work measurement exists, such proof is readily available. But in most maintenance departments no such definitive method is available and the only criteria of measurement are overall trends in maintenance costs and quality of service. Some aspects to be considered in arriving at a sound work-scheduling procedure are work unit, size of jobs scheduled, percent of total work load scheduled, and lead time for scheduling.

Most detailed schedules are laid out in terms of labor-hours or, if standard times are used, fractions of hours. Other scheduling systems use a half craft-day as a minimum work unit. Others may use a craft-day or even a craft-week as a basis. Size of Jobs Scheduled. Some work-scheduling systems handle small jobs as well as large ones. Others schedule only handle major work where the number of crafts persons and the length of time involved are appreciable. Percent of Total Work Load Scheduled. Although in some cases all work may be scheduled, the most effective systems recognize the inability of any maintenance engineering[5] department to anticipate all jobs, especially those of an emergency nature, and do not attempt scheduling for the entire work force. A portion of the available work force is left free for quick assignment to emergency jobs or other priority work not anticipated at the time of scheduling.

Lead time for scheduling[6], or the length of time covered by the schedule, is another variable to be considered. Some scheduling systems do not attempt to cover breakdown repairs and are limited to the routine preventive maintenance and to major work that can be anticipated and scheduled well in advance. In these cases a monthly or biweekly allocation of manpower suffices. In most instances, however, a weekly schedule with a 2- or 3-day lead time results in good performance, yet is sufficiently flexible to handle most unexpected work. In extreme situations a daily schedule with a 16- to 18-hr lead time may be necessary to provide the necessary control. A more workable solution for this situation, however, involves use of a master schedule for a minimum of 2 weeks with provision for modifying it daily.

2.2. A FRAMEWORK OF DISTRIBUTED DATABASE MANAGEMENT SYSTEMS IN THE MODERN ENTERPRISE AND THE UNCERTAINTIES REMOVAL

2.2.1 Distributed Database Management System

Prior to the popular acceptance of DDBMSs, corporations normally relied on centralized databases designed to serve very structured information requirements. These centralized databases[7] had some characteristics in common. First, they ran on powerful and expensive hardware that could handle very large portions of a firm's data reliably. Second, they were administered by a small number of well-trained people who could manage the organization's computers to reduce the uncertainties occurring in organizations. Third, the dedicated data lines forming the corporate wide area network[8] (WAN) had to be highly reliable and have a large capacity, because any downtime will preclude at least one site from operating, and every operation had to be transmitted to and from the central database in real time. These centralized databases could provide adequate performance to firms able to work around their shortcomings. These shortcomings include the lack of flexibility in the application of the firm's information and the requirement to implement a single point of failure for the entire enterprise.

2.2.2 Security

Implementing effective security in a widely distributed database is no small task. It is observed that possible security services in a multitier architecture include authentication, authorization, nonrepudiation, confidentiality, and data integrity. Authentication[9] is the process of having each user, host, or application server prove itself that who they are really. Authorization is the process of ensuring that each authenticated user has the necessary permission level to perform the requested tasks. Nonrepudiation is ensuring that authenticated and authorized users may not deny that they used a designated resource. This makes some recommendations for implementing security in a replicated database environment.

2.2.3 The Future Prospects for DDBMSs:

The issues above demonstrate that a good DDBMS must provide security services, and that organizations must know how to properly implement them. As data is distributed and end-users are given more processing power, potential for security problems increases. Organizations with distributed databases must be competent and vigilant in their execution of security.

DDBMS technology has potential, but its continued growth in popularity is not guaranteed. Just as DDBMSs grew in popularity with client-server, the potential[10] for further growth in their popularity will likely be tied to client-server. The following section examines the potential for future success or failure of DDBMS systems with a focus on client-server trends as indicators of what the future may hold.

2.3 A REVIEW ON WEB APPLICATION SECURITY VULNERABILITIES

2.3.1 Vulnerability

Prior to the popular acceptance of DDBMSs, corporations normally relied on centralized databases designed to serve very structured information requirements. These centralized databases[11] had some characteristics in common. First, they ran on powerful and expensive hardware that could handle very large portions of a firm's data reliably. Second, they were administered by a small number of well-trained people who could manage the organization's computers to reduce the uncertainties occurring in organizations. Third, the dedicated data lines forming the corporate wide area network (WAN) had to be highly reliable and have a large capacity, because any downtime will preclude at least one site from operating, and every operation had to be transmitted to and from the central database in real time. These centralized databases could provide adequate performance to firms able to work around their shortcomings. These shortcomings include the lack of flexibility in the application of the firm's information and the requirement to implement a single point of failure for the entire enterprise[12]. The increased usage of the Internet and network technology has changed the focus in assessing computer environments. The traditional approach considered the location of hardware and equipment first and then the data stored on the hardware. Also, these assessments were primarily at specific points in time and primarily compliance-based reviews. It is insufficient to secure your code just once. A secure coding initiative must deal with all stages of a program's lifecycle. Secure web applications are only possible when a secure SDLC is used. Secure programs are secure by design, during development, and by default.

2.3.2 SQL Injection

SQL injection[13] is a very old approach but it's still popular among attackers. This technique allows an attacker to retrieve crucial information from a Web server's database. Depending on the application's security measures, the impact of this attack can vary from basic information disclosure to remote code execution and total system compromise.

2.4 MODELING METHODS FOR WEB APPLICATION VERIFICATION AND TESTING: STATE OF THE ART

2.4.1 Web Applications

For the purpose of this survey, a web application is a software application that is accessible via a thin client (i.e. web browser)[14] over a network such as the Internet or an intranet. A web application is often structured as a three-tiered application. As shown in Figure 1, the web browser represents the first tier. The web server that implements CGI, PHP, Java Servlets or Active Server Pages (ASP), along with the application server that interacts with the database and other web objects is considered the middle tier. Finally, the database along with the DBMS server[15] forms the third tier.

These web pages can be either static or dynamic. Static pages reside on a web server and contain only HTML and client side executable code (e.g. JavaScript) and are served by the web server. Dynamic pages are generated[16] as the result of the execution of various scripts and components on the server. These pages contain a mixture of HTML source and executable code, and are served by the application server.

2.4.2 Web Services

Web services are a standardized way of integrating web-based applications using separate service communication interfaces that can be used by other web applications. They are primarily used as a means for businesses to communicate with clients and each other without exposing detailed knowledge of each other's IT systems. Communication is usually in XML, and noticed to any particular operating system or programming language. Web services[17] don't require the use of browsers or HTML, and don't provide the user with a GUI. Web services are outside the scope of the present study, but may be a future direction for our work.

III. SYSTEM IMPLEMENTATION

3.1.1 LOGIN:

In this module, we have to use login id and password to access the system. Both user and admin can use this system. Separate login privileges is given to admin and users to access the system. After login id and password are validated from the database, the user access rights are registered based on auto expiring session. If any illegal access attempt is carried out on any pages, the user will automatically be thrown off to the login page.

3.1.2 NOTES:

In this module user can add notes about the task going to do or finished task and store the relevant information about them only after successfully logged into the application. Both admin and user can add, delete and view the notes to help them coordination in the work. The Application Dashboard displays the notes every time we logged into the application until we delete it. It helps the users to create note quickly and remind them properly.

3.1.3 NEW TOOL ADDITION:

In this module user can add details about the tool that are currently in use or used in the industry to track them easily. It allows to add the name of the tool, reference number of the tool, tool number, Drawing number, tool mould type, manufacturing year of the tool, Tool Supplier name, number of cavities in the tool and add the details about the tool maximum and minimum length, width to perform the cavity test. All these details can be used in this application to minimal the work in future.

3.1.4 ADD TOOL HISTORY:

In this module, we can add the working history of the tool which is currently running in the machine. The tools taken out for production and received date should give to track the history of the tool. The tool who taken out for production and receiver name should update properly to ensure who are involving in the work .The starting cycle and number of cycles used in the tool can enter to automatically calculate the cumulative number of cycles and end cycle of the tool by the application. We can add preventive and routine maintenance detail for each cycle and the application automatically notify the user in advance about the maintenance to carry for the tool to preserve the tool for further use. The present condition of the tool can also add to view the conditions of the tool for each cycle in future.

3.1.5 VIEW TOOL HISTORY:

This module allows the users to view the tool history details in digital format as like as hard copy format. It gives the details of product name, tool number, type of mould, supplier name, tool reference, drawing number, manufacturing year of the mould. It displays the tool taken and received date to track the tool history easily. Start cycle and number of cycles helps to display the automatically calculated end cycle and cumulative number of cycles for each cycle of the tool. It helps to check the condition for the each cycle and the reason to receive the tool. This history card helps to avoid the loss of data and can print it as hard copy any time in future.

3.1.6 EDIT TOOL HISTORY:

This module allows the users to edit the incorrect value and changes to make in history card. We can edit the tool production and received date to maintain the correct history of the tool. Incorrect start cycle and number of cycle will be in wrong cumulative cycle and end cycle, so we can edit this any time to generate correct values to proper use of tool. All these edit tool history operation can access only by the admin to avoid the illegal entry made by the user. This is the important feature to ensure the correct maintenance and history of the tool.

3.1.7 CAVITY TEST:

This module can be only used when the preventive maintenance should be done. The cavity test helps to check whether the module exceeds the maximum width and length value or not. It includes two type of test, they are cavity width and length test. In width test, the current module width is compared with the maximum width and in the length test, the current module length is compared with maximum length, if it exceeds the maximum value then the application warns the user by notification as well as the highlighting the exceeded value in view cavity page.

3.1.8 MAINTENANCE LOG:

This module automatically stores the maintenance date and types of the maintenance that has carried out. The cumulative value is also updated automatically for each maintenance. It provides the graphical view for routine and primitive maintenance for easy understanding. The difference between current primitive and routine maintenance cycle is also displayed. This automatic maintenance log helps to avoid the manually entry of the maintenance details.

3.1.9 GRAPHICAL VIEWS:

The Graphical view helps the user to view the number of cycles used in the each tool in year and month wise. It allows to compare the overview of entire process as well as the progress in each year and month. The bar chart helps to understand the usage very easy manner to avoid manual calculation.

IV. RESULT

Fig 4.1 shows that the benefits from the existing to proposed. That includes various operation specifications such as report generation, security, user access, filtered data retrieval.

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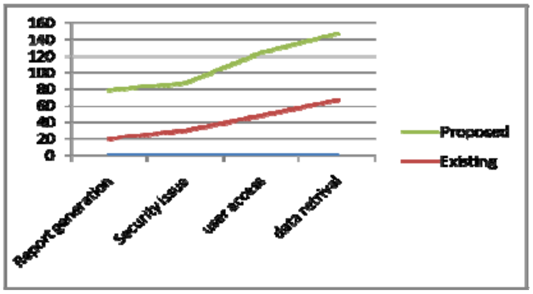

Fig 4.1. System Analysis

V. CONCLUSION

This project suggests an approach for efficient management of tool history process by providing notifications prior maintenance period. Notification will be displayed as alert boxes and also in all main pages. It also provides a way to perform the cavity test for the moulds. Based on number of cavities of tool, the cavity values are tested for both length and width values. The values that are unsatisfied are highlighted in separate colour. These test results can be viewed later in a table form. The application is secured with proper login facilities and password encryption. Finally, it can generate reports in the form of graphs and tables with efficient data retrieval. Thus it helps the operators to track the tool usage history and notifications thereby helps to reduce tool damage.

FUTURE IMPROVEMENTS

The further improvement of the system can be expanding this complete system to cloud and also implementing Mobile based ERP to this system such that the entire system can be accessed anywhere from the mobile. The system can also be connected to the industrial machinery directly for direct data reading and access thereby preventing most of the manual errors. The data updating process can be mostly automated with this improved.

REFERENCES

[1]: Ajay S. Bonde, Ashwadeep C. Fulzele, The Industrial Maintenance Management and Implementing Maintenance Policies for Improvement in Productivity

[2]: A. Crespo Ma´rquez, P. Moreu de Leo´n, J.F. Go´mez Ferna´ndez, C. Parra Ma´rquez and M. Lo´pez Campos Department of Industrial Management, School of Engineering, University of Seville, Seville, Spain

[3]: Bradley PS (2002) Designing the Best Maintenance. http:www.samicorp.com:1–5

[4]: Morel G, Suhner M, Iung B, Léger JB. (2001, October). Maintenance holistic framework for optimizing the cost/availability compromise ofmanuf acturing systems. In: Proceedings ofthe sixth IFAC symposium on cost oriented automation. Survey Paper, Berlin, Germany, October, 2001. ISBN:0-08-043907-1.

[5]: Chelson VJ, Payne CA, Reavill RP (2005) Management for Engineers Scientists and Technologists, 2nd edn. Wiley, Chichester England

[6]: Lindley R. Higgins Darrin J. Wikoff, Maintenance Engineering Handbook. Duffuaa, S.O. (2000), "Mathematical models in maintenance planning and scheduling", in Ben-Daya, M., Duffuaa, S.O. and Raouf, A. (Eds), Maintenance, Modelling and Optimization, Kluwer Academic Publishers, Boston, MA

[7]: Dr. Anand K. Tripathi, Ms.Monika Tripathi, A Framework of Distributed Database Management Systems in the Modern Enterprise and the Uncertainties removal

[8]: Role of IT Infrastructure for Business Transformation Proficient-An International Journal of Management, Malviya Nagar, Jaipur,Rajastan ,ISSN No.0975-475X,Vol.-1,July-Dec.-2009 (Referred Based), edition-4,vol-1, ,pg. 789--793

[9]: "Information Technology and Structuring Of Organization: Information System Research" Published in IMSEC International Journal of Research IMS College Engineering, Ghaziabad, Vol.-1 July-Dec.-2009 (Referred Based) edition1,vol-,1, ,pg. 925-928

[10]: " Data Security levels for Computerized MIS" Artificial Intelligence & its Applications (AIA – 2009) , Department of Computer Science & Engineering, Faculty of Engineering & Technology, RBS College, Bichpuri, Agra (UP), 12-13 September 2009, edition-1,vol-1, ,pg. 555-559

[11]: Ashwani Garg, Shekhar Singh, A Review on Web Application Security Vulnerabilities

[12]: T. Jim, N. Swamy, and M. Hicks. Defeating script injection attacks with browser-enforced embedded policies. In WWW, 2007.

[13]: Microsoft ASP.NET AJAX. http://ajax.asp.net.Y. Minamide. Static approximation of dynamically generated Web pages. In Proc. WWW, 2005.

[14]: Manar H. Alalfi, James R. Cordy, Thomas R. Dean, Modeling methods for web application verification and testing: State of the art.

[15]: Z. Su and G. Wassermann. The essence of command injection attacks in Web applications. In Proc. POPL, 2006.

[16]: Open Web Application Security Project. The ten most critical Web application security vulnerabilities. http://umn.dl.sourceforge.net/sourceforge/ owasp/OWASPTopTen2004.pdf, 2004.

[17]: D. Yu, A. Chander, N. Islam, and I. Serikov. JavaScript instrumentation for browser security. In POPL, 2007