

Enhancing and Automating Bill of Material (BOM)

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Abstract— In most automotive companies they maintain the stock details in Excel sheet, that's not secure for all transactions. Here the E-excel bills of materials are computerized and an easy viewing and tracking of all bill details are done. The bills here contain both the material needed and the primary design of BIW (Body in white) for reference, if any material is to be added or removed from bill or in case of any change in design the bill is updated (i.e) revised. Since bill contain the primary design and the material used which might be needed by other company to produce a better product or to attract customer to produce the same product with some change in design for low cost. This leads to concern in security so a new technique for securing bill of material is introduced in proposed system to provide higher security from hacker like third party hacker, employee leak data to another company. This primarily concerns when unauthorized remote computer break-ins through communication networks such as the Internet, but also includes those who debug or fix security problems, and the morally ambiguous. A secured environment for billing of material is provided using data leakage detection, IDS, IP synchronization. The system is tested for its effectiveness, flexibility, accuracy and user friendly. The proposed system is found to be delightfully running under the web application system.

Key words: Secure Environment, Data Leakage Detection, IP Synchronization

I. INTRODUCTION

In recent decades, industrial companies have decided to invest automated BOM is an important technique used for designing the product structure which reduces much time and money not only in machine, production line automation but also ERP (Enterprise Resource Planning) systems [2]. Bill of Material also plays a vital role in production data management system which is based on product structure [1, 5]. It also incorporates paperless workflow activities by reducing the cost information like labor charge, time etc, [4] which also provides secure system by preventing the data leakage which happens every day when confidential information such as customer data, company secrets, budget information, product details etc are leaked out from the concern. When the information leaks out, then the companies will face a serious risk which is prevented by making the system computerized. It also improves in designing life cycle of product by providing chain collaboration [3]. Before designing a product structure there must be enough product information for a formal BOM to be generated, product designers. The Product structure contains requirements, drawings, rough sketches and other documents in a hierarchical representation that reflects a logical breakdown of the product into components.

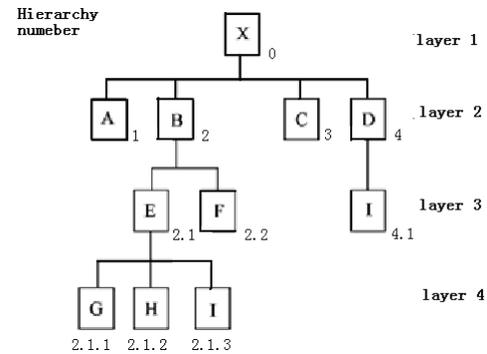


Fig. 1: The Dendritic Structure of Product

The product structure typically comes before final specifications are developed and formal part numbers are defined [6]. Figure 2 shows the work flow of Bill of Materials.

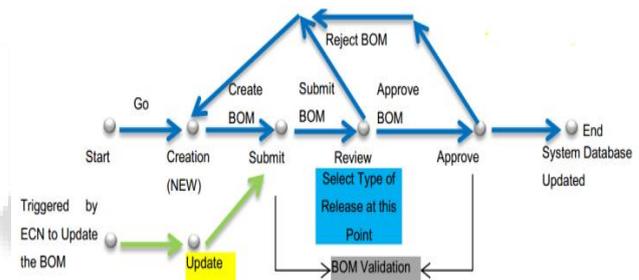


Fig. 2: BOM Configuration Workflow

The main goal of this project is to reduce manual works, increase the processing speed and ensure reliability of data. There are software systems that have been designed to manage bills of materials and the changes that happen to them in which the tools allow the user's to access the same set of product data. The project manager, internal and external, can see the current product revision. The proposed system provides higher security from hacker like third party hacker, employee leak data to another company. A secured environment for billing of material is provided using data leakage detection, IDS, IP synchronization. The system is tested for its effectiveness, flexibility, accuracy and user friendly. The system is more efficient when compared to the previous work.

This paper next continues with literature review of the existing system. The second section will elaborate on the proposed system followed by result analysis in the third section. We will end this paper with conclusions and future work.

II. Literature survey

JIANG Hong-ling [7] proposed a flexible BOM based on tree structure and the prefix code retrieval method. The tree structure storage BOM information, with no duplicate entry

and automatically invoked while making the plan. Prefix code in the system improves the efficiency of retrieval of BOM makes the system efficient.

Min Liu [8] proposed a formal transformation model of BOM view has been developed and deployed in MRO system for steel manufacturing enterprise. The intermediate, inherited, virtual component are defined in the specific maintenance management domain, and feature recognition methods and rules are used to transform process from engineering BOM to maintenance BOM. ZHAO Han[9] proposed an object-oriented model of BOM that analyze and built on the concept of the file aggregate. He introduced chiefly the methods of validating, parsing and showing BOM data stored in XML file. Jia Zhang[10] The author describes the common structure of BOM and proposed a more practical and simplified method for BOM maintenance. HE Wei-ping[11] the author analysis about, concept, functions, structure and generation of the Manufacturing BOM (MQBOM). It is used as an effective organization form of quality data stream with digital quality management mode. TANG Yan [12] proposed an enhanced algorithm which can directly get the decomposed result of Bill of Material without converting pointer code to level code; the algorithm simplifies the operation effectively.

A. Comparison Table Based On the Methods (BOS)

sn o	Methods	Description	Advantages	Disadvantages
1.	A study of BOM automatic creation based on products [13]	This principle foundation, one kind of automatic creation method of BOM, is designed, realizing massive information obtaining the spare parts and the automatic creation of BOM, providing important data for the PDM system	Easy to billing	Data's are missing
2.	Business Process Integration Technique based on BOM [14]	To hand over sensitive data to agents that may unknowingly or maliciously leak it. And even if we had to hand	Model of different BOM	Difficulty in mapping intermediate components

		over sensitive data, in a perfect world, we could watermark each object so that we could trace its origins with absolute certainty		
3.	a new type of BOM model and its application [15]	to describe the assembly relation exactly, 'part' element contains attributes of partid and qty at least and has a self nested structure.	check id to provide data	Time latency
4.	A BOM generation algorithm of ERP[16]	Recursive algorithm, hierarchical algorithm and improved algorithm are tested under the same operating environment in the same PC.	Accurate output	System overloaded
5.	Structured bill of material design and consistency maintenance in drilling [17]	, the key of the development of management information systems based on the model and the method is the implementation of the ODBOM, that is, a rational design for data structure of ODBOM	Key to secure data	Difficult to maintain

Table 1: Comparison Table Based On the Methods (BOS)

III. PROBLEM DEFINITION

Even the smallest businesses need to implement some type of inventory control system to maintain the accurate merchandise count and for accounting purposes. Business owners generally use a computerized and a manual inventory system. A manual system offers a number of potential advantages and disadvantages. The drawbacks are:

- Search complexity is high.
- No secured Firewall, so the database can be accessed by anyone at anytime leads to insufficient of security
- Data can be hacked easily.

IV. PROPOSED SYSTEM

The proposed system is designed in a way that it overcomes the existing drawbacks. Being able to manage the large amount of information generated by BOM can be overwhelming. The real Tool is simple and smart for preparing and managing BOM.

Proposed system keeps the BOMs consistent when transferring the data from Excel to a BOM management system based on the rule. BOM in consistent formats transfers the information easily based on the algorithm and clears up the duplicate entries in the system. Generating part numbers from a central location or list greatly reduces the likelihood of creating duplicate parts. By naming conventions the engineers can more easily find and reuse existing components instead of unnecessarily creating duplicate parts.

Minimizing repeated data is done with part no and it is clearly needs to be listed in more than one bill of materials. Having additional details repeated in multiple locations adds complexity by increasing the potential that one of the details will be changed, cause confusion and need to be investigated and reconciled which is overcome in the system.

Being able to manage the large amount of information generated by BOM can be overwhelming. Reporting engine is flexible, comfortable to use, and most importantly, comprehensive using group movement pattern. The professional reports generated by the system are meaningful, easy to read, real-time information that will help you make better management decisions.

All data can be run in summary or detail mode for any date range eliminating redundant reports and confusing lists to choose from. The explorer-like report manager allows quick and easy access to any report, and allows the user to group the favorite reports to be run depending upon batch mode. Based on the users need the piece of information are filtered and narrow. And it contains centralized data access control to store all the information perfectly in the database.

Secured BOM ensures access to your information with the ability of using the Internet to view your data. Either post reports to a web site of your choice or configure Web based reporting engine that enables you to access your data over the Internet or corporate Intranet in real-time. The tool contributes to reduced remote management costs.

Since every environment is different, Secured BOM allows you to easily customize the layout of your order screens with an easy-to-use design tool. User can change the size, color or position of any of the screen

components such as the item grid, on-screen bill , category grid, and function buttons during the time of maintenance.

And since different screen layouts can be used on different terminals, mixed environments are easily handled. According to security, the security the network has been well preserved with Data leakage detection and Intrusion detection system has been implemented.

A. Advantages of proposed method

- While computerizing all the details the provides easy access to data.
- Accuracy improvements & time savings, in addition to the reduction of fixing costly mistakes, can result in considerable cost savings across an organization.
- Keeps BOM consistent
- Minimize repeated data.
- Issues, events & projects assignment & monitoring
- Implementing data leakage detection using agent guilt model for monitoring the outgoing data from the server.
- Implementing Intrusion detection system to unauthorized user into the server.
- Enhancing group movement pattern for clarity data view
- Introducing IP synchronization for avoiding data misuse from another location.

V. RESULT ANALYSIS:

As the first process in the system, a login is being created to the admin providing employee permissions and roles. The figure 3 shows to the login credentials to the Admin.



Fig. 3: Admin Login

As soon as admin login, admin have options to enter the employee details, viewing employee details, confirming bill of material. Administrator manages the entire employee details. And admin can edit the employee information's.

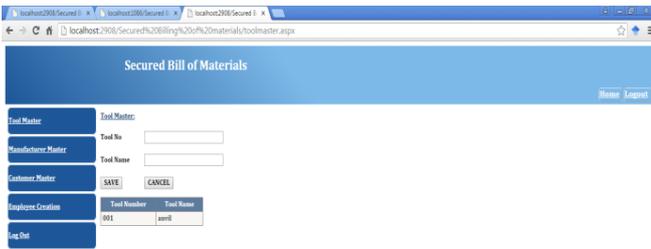


Fig. 4: Adding Tools- Tool Master

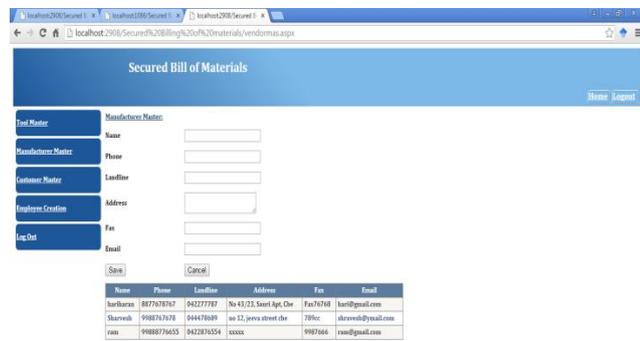


Fig. 5: Manufacturer Details – Manufacturer Master

Figure 5 shows the Manufactures list. Admin maintains manufacturer, Customer details and employee details. Individual username and password is provided for each employee to view their details.



Fig. 6: Assigning Project to generate bill Employees

After adding the employees, projects are assigned to employees to generate bill for project. Admin can select the project with tool details and send to the required number of employees. Fig 6 shows the admin assigning tools to employees.

The system is more secure, so that data leakage is reduced and central storage is maintained by the administrator. It reduces the time consumption an.

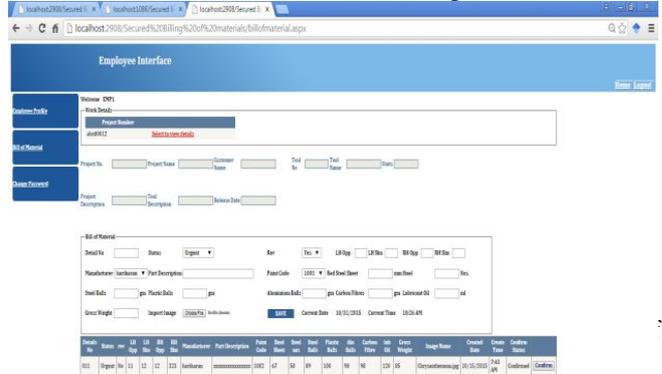


Fig. 7: Employee Interface

Figure 7 shows the employee interface. One of the employees assigned with project to generate bill can fill the full details of assigned project and send it to the admin. Admin confirms the employee status.

VI. CONCLUSION

The current developed system is found to be working accurately. It is tested for its effectiveness, flexibility, accuracy and user friendly. The system is found to be delightful running under the web application system.

The programming techniques used in the design of the system provides a scope for further expansion and implementation of any changes which may occur in future. The system has been tested with all sample data covering all possible options for each function. Its performance is satisfactory the system is under implementation.

Documentations are done in such a way, that any other software developer can easily undergo this system, before undergoing for development for any changes that is to be single window system to the present system. The present work has been completed for web application, to technical terms used in this application. This is because all the technical fields and process are about to implement in the future enhancement. At present the system has been working properly up to the requirements.

VII. FUTURE WORK

The system has been designed and developed according to the current requirements of the user. At the same time the system is very flexible and extensible, hence, future enhancements, if needed can be made without much difficulty, so new applications can be developed and it will

be integrated with the existing one very easily. Data leakage detection is added for the future work.

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