

Impact of IT Tool on Shopfloor Documenting and Monitoring

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Abstract—*The efficiency of a manufacturing shop floor is one of the crucial factors. The ability of a manufacturing company to evaluate and monitor its shop floor directly impacts on its ability to make better decisions manage resources and improve the overall state of affairs. The use of information technology to facilitate this process has become a necessity in all manufacturing firms. In this paper, a case study is presented where an IT tool was developed for monitoring the shop floor efficiency in a earth moving equipment manufacturing company. The results of the implementation and the advantage the IT tool presented have also been provided.*

Keywords: - IT in Manufacturing, Shop floor monitoring, Shop floor efficiency.

I. INTRODUCTION

The dynamics of the modern machining industries is quite drastic and the nature of these companies faces fierce competition both globally and locally. The need to constantly evolve the business processes and systems has become a necessity for all companies. The need to incorporate Information technologies to streamline and restructure the production process has become evident in the modern machining industries.

The usage of IT tools in the modern machining industries can not only improve the overall productivity of the shop floor, it can also enable the management to make well informed decisions. Usage of IT tools and infrastructure can also be determinant factor in determining the success and sustainability in these economic situations.

This paper presents an earth moving equipment manufacturing company as a case study for which an IT tool was developed. The case study illustrates the existing system of documentation and shop floor management; and the competitive advantage the IT tool.

II. LITERATURE REVIEW

In today's competitive world, the industries have identified and understood the importance of Information Technology in their day to day activities.

The performance measurement of the shop floor plays a key role in monitoring and improving performance of the shop floor. There have been several instances where research is carried out on developing systems for measuring shop floor efficiency. The impact of diffusion of this knowledge has been clearly defined by Matti Verkasalo et al, [2]. The transfer of correct information at correct time to the correct person can increase the efficiency and utilization of knowledge transfer.

Efficiency and accuracy at production lines enables better production and utilization of the available resources. An accurate data management and shop floor monitoring system is equally important in improving production performance [1].

It is difficult to implement all the performance indicators to the information system. The company needs methods to specify the design and implementation. So the developer should convey the software requirements specification (SRS) to the users in a detailed manner[3].

Shop-floor is one of the most important departments directly influencing the manufacturing efficiency [4]. the performance management affects behavior of individuals in an organization, it also facilitates the achievement of organizational goals. The involvement of employees interaction and involvement in the manufacturing firms a crucial role. Only on employee involvement can the performance improvement initiatives in the company be implemented properly. [5]

A system which holistically measures and monitors the state of the shop floor is a key consideration in any manufacturing firm. The measures of efficiency and efficiency improvement must be such that all the metrics must be given importance. [6]

III. EXISTING SYSTEM

In the fabrication department in consideration of the earth moving equipment manufacturing company, the present information management is fragmented and the tools used though serving their purpose lack efficiency. For the purpose of providing a strategic edge in the decision making process, these systems are not suitable.

The present practices of manual drafting and reporting for documentation and communication, distributed book keeping practices, redundancy and manual overlay in the data management systems is intended to be streamlined for efficiency and optimization by using IT enabled systems and techniques for greater productivity in the work environment.

The usage of IT based techniques and tools for quick generation of established reports, easily create ad-hoc reports, isolate specific problems, trend analysis, analyze data across multiple systems and provide seamless integration for new data sources are few of the expected advantages.

The Figure 1, illustrates the process flow for the existing system. The documentation process begins with the supervisor recording log sheets for all the jobs occurring on the shop floor relevant to his zone. The employees also record their job status. The supervisor then transfers these manual data entry sheets to a reporting supervisor, who enters the same data into excel. The reporting supervisor is also responsible for converting the data into suitable reports. These reports are then emailed to the module leaders, production supervisors, quality heads and other managerial heads on a daily basis. This push process illustrates redundancy of data and a daily overhead in the data management process.

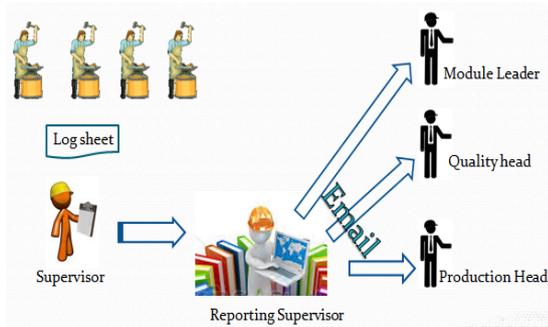


Fig. 1: Existing documentation and reporting system

There are numerous drawbacks to the existing systems, the key drawbacks being.

- A supervisor is dedicated to collect log sheets from all the zones and entry log sheet data in excel
- The supervisor who reports doesn't have direct involvement with employees about their job
- Time consuming
- Redundant data entry process
- Work Order No. is not included
- Reporting is a push process
- New reports have to be manually created for different specifications.

IV. PROPOSED SYSTEM: FABSHOP MONITOR

The proposed system involves the usage of a centralized IT tools which streamlines the entire documentation and reporting process. The system is built upon the existing log sheet maintenance process of the workers and eliminate the role of the reporting supervisor. The proposed system is illustrated in figure 2.

The proposed system illustrates how the workers themselves maintains the logsheets for the daily activities. The sheets are collected and forwarded to a data entry operator who enters the data into the IT tool developed. The data entry operator need not be a dedicated person, he can be any supervisor who is available for that time. The IT tool stores the data into a centralized database. All the stakeholders can then access the IT tool and generate any report as per the requirements.

The proposed system streamlines the existing system and removes the overheads involved in the existing system. The proposed system provides more ownership for the workers. It provides accurate information of resources utilization and time in a real time environment. The system also enables the generation of reports on demand (Pull process).

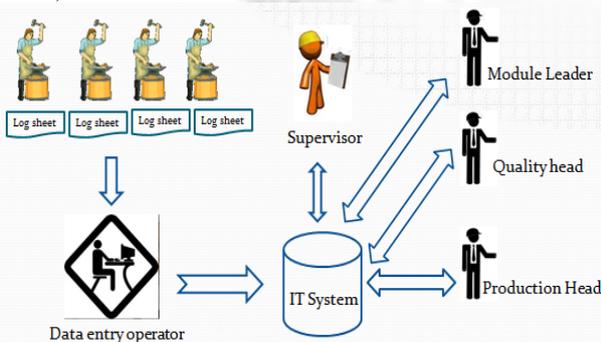


Fig. 2: Proposed documentation and reporting process

The system also enables identification of bottlenecks and deviant jobs and processes. Based on the data, it assists in the planning and scheduling. It also enables the identification of high performing employees.

V. RESULTS

The testing of the IT tool developed has resulted in remarkable results. Based on the results observed, the time taken to document and record the data has on an average reduced by 1.6 hrs or around 96 minutes per day as shown in Figure 3.

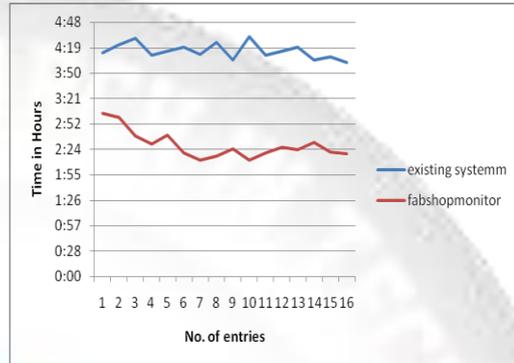


Fig. 3: Existing documentation and report in system

It has also been noticed that the time taken for generation of reports has reduced to 8.33 seconds from 144 seconds as illustrated in figure 4.

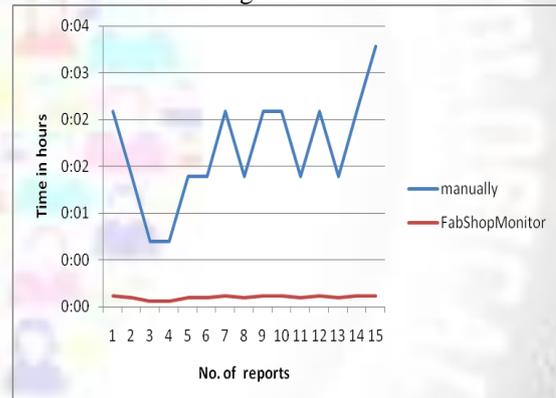


Fig. 4: Existing reporting system

The most crucial advantage noticed by the usage of the IT tool is that the time taken to track errors has been reduced from 348 seconds to 17 seconds.

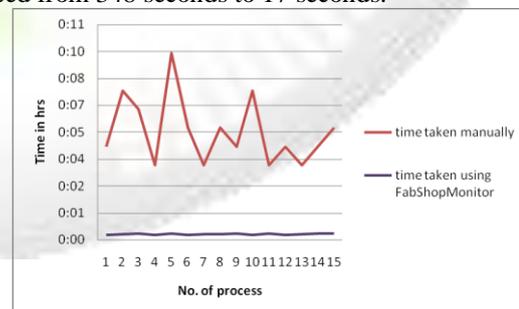


Fig. 5: Time study for error tracking

Based on the data it has also been observed the existence of many deviant jobs which require much less time than the agreed standard time. The most deviant job has been found to be deviation of by 64%. Similarly the other jobs have found a deviation of 32%

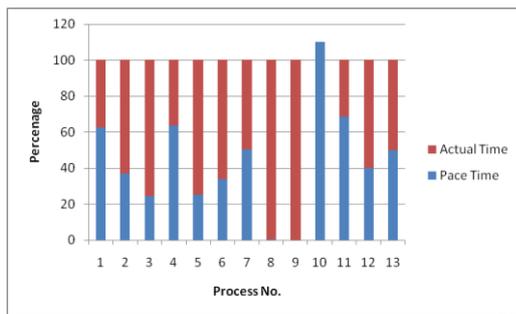


Fig. 6: Percentage deviation between Pace time against Standard time

On an average, the total deviation observed for a particular model has been found to be 537mins, which could dramatically change the manner in which the scheduling operation happens. This can be seen in figure 6. Enabling the company to produce more streamlined and well fitted production plan.

VI. CONCLUSION

Based on the results, it has been observed that the usage of IT tool in the documentation and reporting process can greatly impact the company's operations. It not only reduces the time and efforts needed for the documentation and reporting process but also reduces the amount of resources and manpower required.

The usage of such IT tools enables the company to make educated decisions which reduce wastages, improve productivity and optimize daily operations.

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