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Real Time Production Data Monitoring System

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Abstract: *Production floors are utilizing manual type of data collection for generating reports. Manual data compilation leaves room for both inconsistencies and inaccuracies when manual data collection is practiced, there is usually a second step of manually compiling the data. This is most commonly accomplished by entering in the information (Data) into spreadsheets. When the data is collected without the help of a production performance score board then the data can be inaccurate. Where there is human intervention on the recording and collection of data, the trustworthiness of the collected data is no longer reliable. Another disadvantage of manual data collection is sustainability. This paper presents an automated data display system for production performance. Once the data displayed, it is transferred into computers at the remote office. The system will generate an automated report which stays in place and the management only need to act base on the results. This cost effective automatic data collection is the alternative to manual data collection. It improves the accuracy of the valuable reports for the managements.*

Keywords- *Product lifecycle management; Production monitoring system; Remote monitoring; Real time information; Manufacturing execution system; E-manufacturing.*

1. INTRODUCTION

The main goal of the paper is to provide an overview of the existing system and its possible drawbacks that resulted in the existence of PMS (Production Monitoring System). Instantly, current study is been done to access each and every product that is been scanned with the help of barcode scanner, lifecycle of that product generation process of that product and possibly the advantages and limitations of that product. When the product is scanned and inputted by the user, it also permits us to estimate the products optimal value after the product is proceed successfully and automatically. Hence, the generated product will be efficient, cost effective and will surely increase the profit of small and medium companies. This is applicable to the most of the small and medium scale (SME) companies as it is cost effective and affordable to most of the SME's. The generated product which comes out of it is an efficient product and satisfies the most companies as it is generated automatically without less human intervention.

The tremendous increase in the competitive and global market highlights the pivotal aspects of the design quality, productivity, Synchronization and communication of different companies and estimations of product price, there are many challenges which are forced by SME's in developing a cost effective quality product. Developing SME's sector is considered as the backbone of economy contributing to 45% of the industrial output. There are several factors that have contributed towards the growth of SME's by local and foreign investors, various trade directories and trade portals that facilitate trade between buyer and supplier and thus reducing the barrier o f trade. It is possible that more implication of SME's in production system through supply chain links with MNC's can contribute to economic growth in abundance[1].

2. PRODUCTION MONITORING SYSTEM

Manufacturing wanting to gain competitive advantage in tough global condition must reduce waste and maximize productivity to achieve this requires access to precise and accurate information for measurement, Tracking and analyze of production process through some of production monitoring system. PMS is a system that is used in real time to record and analyze production line problems. Different hardware constraint like PLC (Programmable logic controller),sensors scanners which are used to scan the information employed in a product are used to gathered some information from production lines. Every production team at various shops floors collects the data, analyzes it and responds periodically that may have an impact on desired result. It also facilitates by informing team and generating signals so that team can detect faults and improve the overall efficiency of product. The data which is produced automatically also helps the management and others members to take some prompt actions that can be benefited to the company [1].

3. MODULES OF PMS

Production data collected on the shop floor may be with inconsistency, mostly due to human intervention or improper production monitoring system. The human role is more common in this case. That is why a PMS should capture most of the required data without human factor. When an unscheduled outage does happen, time is spent notifying support resources that a problem has occurred, time is spent for the support resource to respond to the issue, time is spent troubleshooting and finally time is spent to resolve the error. But predictive nature of continuous remote monitoring more

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often avoids unscheduled outages by addressing the issues before they affect machine operation and product quality.

The most important requirements of any PMS are that the system is economical, accurate and easy to set up on a production line. And it has to be capable of providing straightforward connectivity to switches, sensors, PLC outputs and other common industrial equipment. If the true production data can be automatically captured and presented in a simple, understandable way to the operators, they will become a more integral part of the improvement process[3][4].

Relatively simpler systems may have greater potential for real-time control. An effective production monitoring system should be at least comprised of the four elements: collection, display, analysis and data storage (see Fig 1).
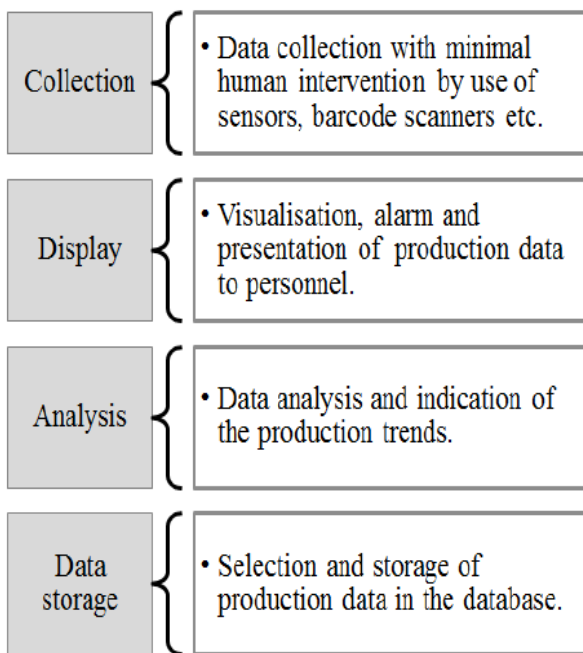
Figure 1: PMS Module

Visualization of data can be made through displays, andon boards and mobile solutions, like smart-phones etc [1].

4. WORKS OF REAL TIME PMS

The real time PMS in manufacturing industries enables both the management and the production team to continually monitor real time production status with regard to reliability, accessibility and maintainability of the equipments. Information must be collected at each shift end and Disseminated accurately in order to meet the production goals. The ability of the PMS to collect production information on real time basis would enable the production team to respond, in a timely manner, to solve any production related issues that may arise.

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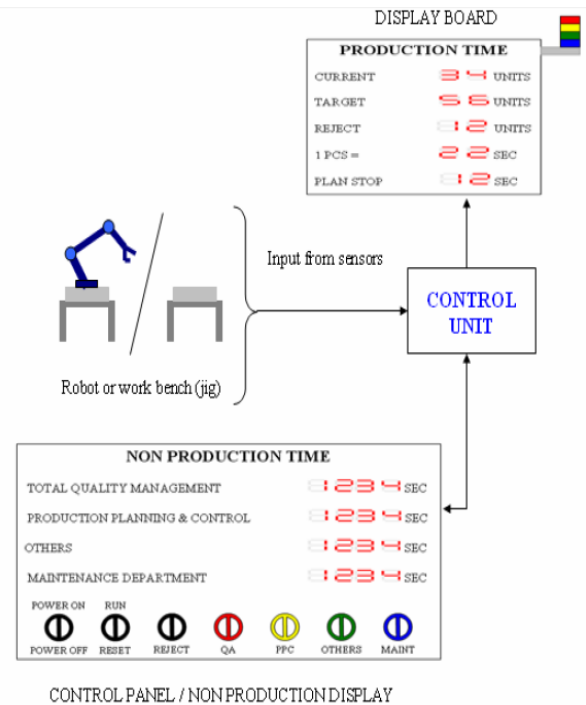The key objective of a real time PMS as shown in Fig. 2.

Figure 2: The Real Time PMS Layout

The task of a PMS is to assist the production team to produce their best within the available resources. Apart from that PMS helps in improving quality matters and reducing overheads. This system should also proactively detect and react to the faults by informing the relevant personnel in the departments before they escalate. Data collected should be used in analysis and should be ranked for further action [2].

5. USEFULNESS OF REAL TIME PMS

The Advantage of installing an effective and efficient real time PMS is the immediate on screen access to all production information [2].

A. OPERATORS

The designed PMS is a reliable tool for assisting the operators especially in informing operator of their perfor-mance to date. The PMS also will be able to guide the operator to maintain a consistent pace throughout the day and this will result in a better implementation of work morale among the employees. Once the operators have been tuned to react according to the PMS, this will automatically eliminate wasted time and hence produce more units per hour[2].

B. PRODUCTION GROUP

Fig. 3 illustrates the chore of the production group (level 2).

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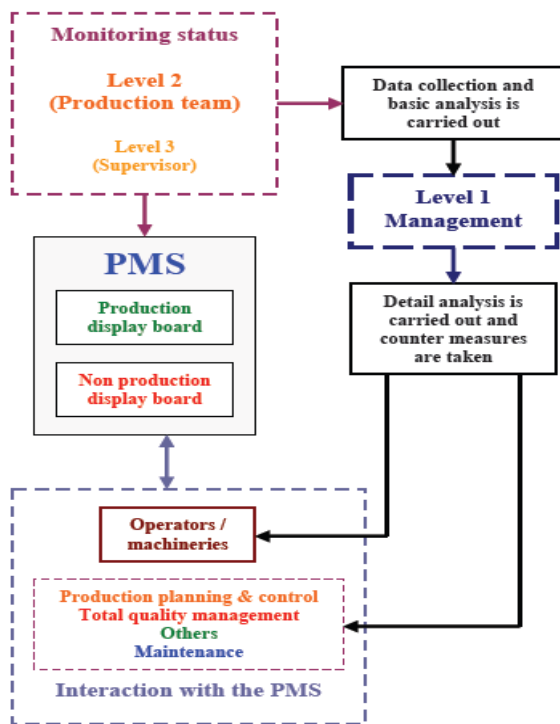
Figure3: Flow of PMS Process

The proposed PMS helps the production team to ensure production goals to be established and monitored continually. Apart from that PMS also helps to increase production at controlled production costs, at all levels of work force, within the set targets and enable continuous improvement of line balancing (bottle neck). PMS helps to screen the work progress and creates awareness when work is not flowing, i.e. it sustains the required production output [2].

C. *OBSERVER*

PMS also advantage of the Observer or the line-leader whereby it act as a supervisory tool, which enables the movement of people from one job to another when operators are absent or unable to meet production requirements. The observer should be able to monitor the performance of their production lines by referring to the display boards. This will help them to keep the production output back on track. The process flow of the PMS as shown in Fig. 2 illustrates the task of the supervisor (level 3).

D. *MANAGEMENT*

All production related information is presented to the management and supervisors via display boards. These eliminate the clerical error which makes reporting easier compared to conventional methods. Relevant production information can be generated base on the industry requirement and this will help the management to summarize throughput, work in progress, stock information (produced parts) and work around solutions as problems occur. From the data-base the management can also eliminate bottlenecks, unwanted wastage and production interruption. As a result of the analysis the managements can make counter-measures to ensure better efficiency and capitalize on the available resources for

generating better production yield. The process flow of the PMS as shown in Fig. 3 illustrates the task of the management (level 1) [2].All production related information is presented to the management and supervisors via display boards. These eliminate the clerical error which makes reporting easier compared to conventional methods. Relevant production information can be generated base on the industry requirement and this will help the management to summarize throughput, work in progress, stock information (produced parts) and work around solutions as problems occur. From the data-base the management can also eliminate bottlenecks, unwanted wastage and production interruption. As a result of the analysis the managements can make counter-measures to ensure better efficiency and capitalize on the available resources for generating better production yield. The process flow of the PMS as shown in Fig. 3 illustrates the task of the management (level 1) [2].

6. TRENDS

The trends of PMS solutions can be summarized as follows:

- Standardized plug & play connectivity

- Real time performance

- Web-based architecture

- Scalability and re-configurability

It tremendously with the degree of increased automation on the shop floor. Manufacturing systems grow because of the need for more complex processes to meet the needs of in-creased product working. It means that PMS has to be is evi-dent that the amount of information collected from control systems increases connected to more equipment and process more data at the same time. In addition to these trends, there is future direction to self-learning and decision making system that maximally eliminate human intervention. General trend is to use PMS for improvement of the production processes by applying: statistical process control, mathematical modeling and optimization of the production process [1].

7. APPLICATIONS

Each production SME has differences in manufacturing processes, equipment, priorities and capital resources. That is why such questions still need to be answered:

- Preference to the type of information

- Different Storage for Permanent and temporary information

- Plug and Play

- Independent of format of information

- Information shown in well defined manner [1]

8. CONCLUSION

Capturing and distributing production information at all levels along the production process is necessary and this could be

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realized by using a real time PMS. PMS ensures the achievement of realistic production goals with available re-sources and better production yield.

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