

Real time production performance monitoring system a production aid for all industries

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Abstract: - A number of production floors are utilizing manual methods of data collection for producing 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 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 truthfulness of the collected data is no longer reliable. Another disadvantage of manual data collection is sustainability. The more intensive the task for improvement is attempted, the more likely the priorities will change and the OEE initiative will fade along the way. 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 significantly improves the accuracy of the valuable reports for the managements.

Key-Words: - Production floors, overall equipment effectiveness, production performance score board, remote office, production monitoring system, programmable logic controller, automated data display system

1 History of Jidoka

The “andon” system is one of the elements that make up the principle of Jidoka. In ancient Japan. Jidoka is a Japanese term for automation (automation with a human element) and refers to principle of stopping work immediately, when a problem occurs^[1]. In the olden days andon is a paper lantern which is a handy vertical collapsible paper lampshade with an open top and a candle placed at the central section of the closed bottom. To the ancient Japanese, andon functioned as a flashlight, a signaling device in distance, or even a commercial sign.

The development of science and technology has seen many new technologies being implemented. This results in the evolution of the Production Monitoring System (PMS) Nowadays, the systems of “andon” in many industries are advanced into

electronic devices with audio and color-coded visual display.

2 Introduction to PMS

A real time PMS is a production tool that helps the management to gather and distribute information to everyone in the shop floor as events are happening. Real time PMS is essential in helping the industries to achieve realistic production goals, at reduced down time and increase in yield.

Developing a reliable system which is truthful in data capture and displaying them is not a factor, yet there are certain limitations in the available devices^[2]. Based on studies conducted, various approaches are taken to further lessen the problems faced by the management in industries. These problems are critical when there are human interventions in the production process.

This study is conducted to develop a real time PMS to replace human supervision on production lines.. Information from production lines is essential for the management to enhance the production yield in all stages [2, 3, 4, 5]. Capturing and interpreting this production data without human intervention is a major challenge for the management. Collected data may not be truthful due to the improper monitoring system, the inaccuracy of the monitoring device and human intervention.

3 Task of a 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 key objective of a real time PMS as shown in Fig. 1.

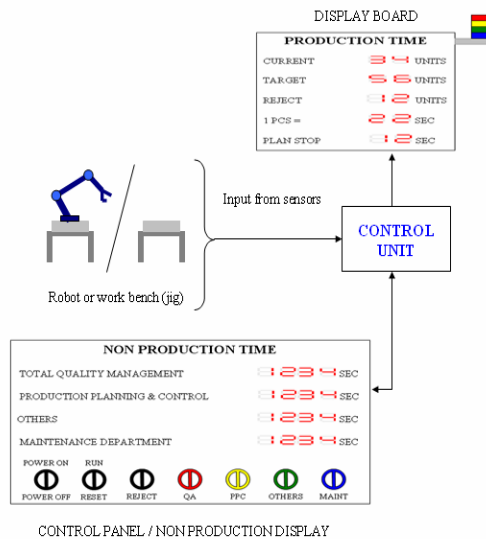


Fig. 1 : The real time PMS layout

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.

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.

4 Usefulness of a real time PMS

The benefits of installing an effective and efficient real time PMS is the immediate on screen access to all production related information.

4.1 Man power (Operators)

The proposed PMS is a reliable tool for assisting the operators especially in informing operator of their performance 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.

This system also empowers the operator to recognize faults and react to the system in alerting the respective departments to solve problems as they occur as shown in Fig. 2.

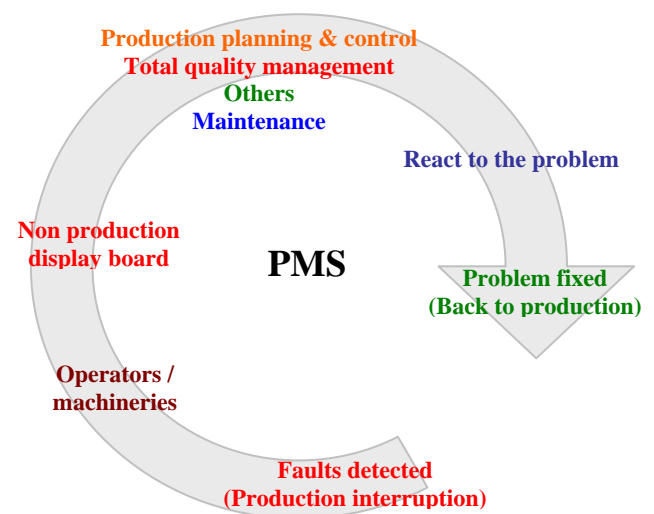


Fig. 2: The process cycle to problem solve faults at work stations using PMS

4.3 Supervisors

PMS also benefit the supervisors 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 supervisor 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. 3 illustrates the task of the supervisor (level 3).

4.2 Production team

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

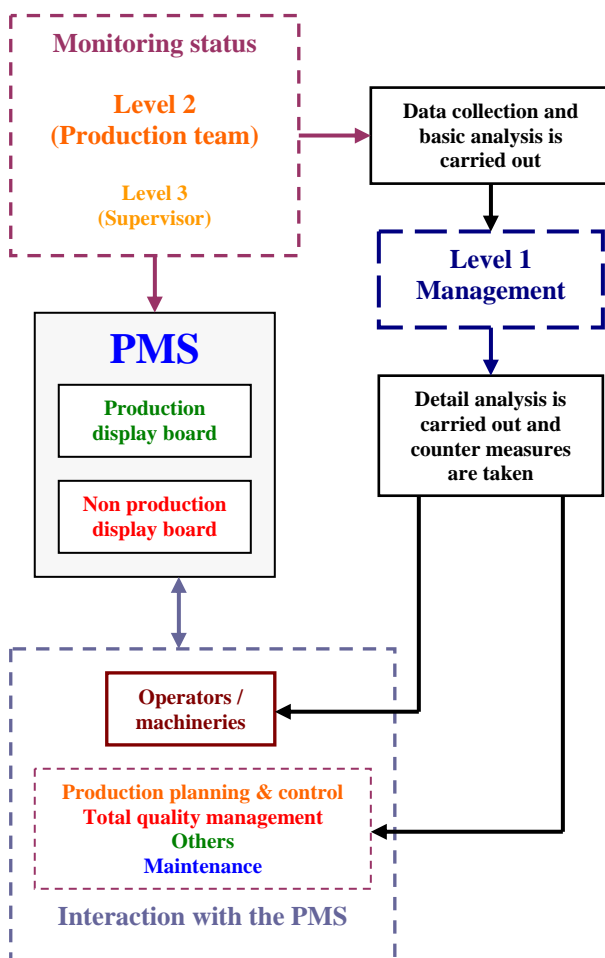


Fig. 3: The process flow of the PMS

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. The process flow of the PMS as shown in

4.4 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).

5 Conclusion

Capturing and distributing production information at all levels along the production process is necessary and this could be realized by using a real time PMS. PMS ensures the achievement of realistic production goals with available resources and better production yield.

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