CHOOSING OF APPROPRIATE OPERATIVE EVIDENCE IN COMPANY PRODUCING TUBULAR PRODUCTS

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Abstract

This article identifies requirements and conditions for choosing and implementation of appropriate information system for production tracking and evidence in company producing tubular products. The article defines topic of optimal customization of production tracking information system taking into consideration: type of production machine, detail of production tracking, type of tracked data, interval of tracking, reporting requirements and technological possibilities for production tracking. The article is prepared based on practical experiences with preparation and implementation of information system for production tracking and evidence in tubular production. The article defines requirements for such an information system and its data structures that are not easily accessible in literature and are key for successful and effective implementation of this information system.

Keywords: Operative evidence, tubular products, track production, production tracking, MES

1. INTRODUCTION

Operative evidence is a basic tool, which enables the enterprise to obtain a feedback about running production, about a state of storage reserves of the production materials and about the reserves of its own production (production in progress, semi-finished products and finished products). Unknowing this information, it is not possible to correct the running production process depending on conditions in production. Aim of this article is to choose a suitable detail for production tracking, which will provide all necessary information, but - at the same time - will not uselessly decrease the effectiveness of the production process. The detail of production tracking can be also changed during the course of the production process. At the present, there is a lot of accessible information systems and technologies, which can simplify and systematize the operative evidence and this article will identify which are the most appropriate for tubular production.

2. PRODUCTION TRACKING WITHIN OPERATIVE EVIDENCE

Production tracking within operative evidence should cover completely all production steps so that the management had a possibility in any moment to obtain a complete image about the state of production both in general and for partial products and orders. Integral part is tracking of the storage management from the material consumption for the production to the dispatch of the finished products. Prior to the proper implementation of the information system for the production tracking, it is necessary to ensure that the company's management will reply to the question which types of information it needs for effective decision-making. These requirements for information are, then, handed-over to an implementation company or to the internal IT team, which will propose a suitable solution with the use of particular information system for operative evidence including production tracking and data gathering. Without a clear definition of the aims of such a project, the company hazards that the final solution will not bring the expected benefits [1].

Questions, which must be answered before the proper implementation of the information system for operative evidence:

- From which production devices and for which production steps do we need to track the production?
- For which detail do we want to track the production?
- What are the information that we want to gather and its structure?
- With which time intervals do we need to track the production?
- Which requirements are there on the outputs? Which reports do we need?
- For which groups of users the data have to be available?
- Which technologies do we want to use for production tracking?

The ideal information system for production tracking provides data in such a time interval, a detail, quality and a form, which enable quick and effective reactions for the changes of the conditions in production and which provide a sufficient data base for the evaluation of the production effectiveness and accompanied logistics processes.

3. SELECTION OF PRODUCTION DEVICES AND PRODUCTION STEPS FOR PRODUCTION TRACKING

Ideally, all production stages and steps should be tracked. It is possible to identify the appropriate method of tracking the production and gathering production data almost for any production equipment. In certain cases, however, costs for the implementation of such an information system can be too high compared with a value of information provided by this system. That's why a proposal should be developed prior to the proper implementation of information system, which will clearly show which types of data gathering can be used for production tracking and which costs will be generated by this implementation. The company's management must determine the value of information, which can be obtained by this information system and to compare this value with the costs related to the implementation of this solution [2].

4. SELECTION OF PRODUCT DETAIL FOR PRODUCTION TRACKING

As far as a decision about where production data will be collected within the production process is made, it is also necessary to reply to a question for what the lowest product detail these data will be collected. As an example, the production of seamless tubes can be mentioned, where production is tracked in a different detail in dependence on the manufactured products. For example, during production of casing tubes for oil wells, each separate tube must be tracked, since each tube has to bear precise information about which production steps were performed on it and also which results were reached during nondestructive testing. The opposite of these tubes are the structural tubes, for which the standard doesn't require so strict production tracking and testing, and such tubes are tracked in a detail of a production or dispatch bundle, which bears all necessary information on its overall weight, length, a number of pieces and performed production operations. The diameter of the tubes is also important here. It is easy to track and implement each separate tube into the system for big diameters; and - on the contrary - it is not possible for small diameters without using of advance technology, as well as without a significant increase of labor consumption or without decelerating the production flow, which can be even ten-fold quicker than in case of the big tubes [3].

As is clear from this example, the choice of appropriate product detail for production tracking can be dependent on extern influences such as a request of the market for a particular product, or on internal influences, where tracking of each separate tube in case of small diameters would be ineffective and when it is enough for the management to track the production only for separate bundles which contain homogeneous products [4].

5. SELECTION OF TIME INTERVAL FOR PRODUCTION TRACKING

The management must here weigh in which interval the production tracking must provide data for the information system for operative evidence. Ideally, it is on-line tracking providing immediate view to the course of production and enabling an immediate reaction for any unexpected circumstances. A disadvantage of online tracking is that the data are continually changed and their use for reporting is problematic. For example, information on the entire production for a particular date can be subject of corrections due to circumstances which are not "seen" by the tracking system, but which must be considered for the purpose of operative evidencing.

In the case of manually entered data, it is also not effective, for example, to enter reasons of each failure immediately after its origination. The information system records a downtime, but its classifying with detailed reasoning of downtime is performed, for example, by the head of the production department once a day. By this, it will also ensure the quality of the provided feedback, which - in case of entering data by production operators - doesn't need to be adequate.

In general, it can be said that the collection of the data from production for operative evidence information system should go on automatically and with the shortest time interval so that reactions on the changes in the production were effective. In manually entered data, by contract, it is suitable to choose a time interval which will ensure their sufficient quality and will not uselessly load production operators [5,6].

6. REQUIREMENTS FOR OUTPUTS OF OPERATIVE EVIDENCE

Another very important step is to define which outputs of operative evidence - i.e. the system for production tracking - are expected by the management. These outputs can be, for example, on-line view to the state of the running production, displaying of the actual state of the finished production, displaying of the state of the semi-finished production in front of a particular production device, displaying of the daily report of the finished production, displaying of the development of the failure rate on the given device, and so on. It is necessary to define for each such a report which data should be displayed, in which structure and for which period of time. Based on these requirements, the supplier of the system for production tracking can propose a corresponding data structure, which will ensure a possibility of creation of the required reports. On the basis of these requirements, demands for the storage of the historical data can be deduced so that they were available for later analyzing. It is necessary to remember here that production tracking systems are preferably focused on displaying the actual situation in production, and only secondarily on the collection of the historical data for later analyzing [7,8].

7. POSSIBILITIES FOR PRODUCTION TRACKING AND DATA GATHERING

As soon as all above-mentioned requirements for functionalities and outputs for the production tracking information systems are defined, it is possible to begin to select suitable technological solution which will ensure the proper production tracking. Selection of right technological solution depends on many circumstances and can provide different levels of automation. The basic possibility is to enter data on the running production into the system manually. In this case, an employee - after finishing a production step - confirms this fact in the system for the given order and adds quantity. This step can be partially automatized, for example, by using the bar-codes (EAN), which are used for the identification of the given order, bundle and operation. Reading of these bar-codes can be manual or automatized. The bar-codes can be replaced by a technology for the close communication, and the order, thus, can be automatically identified and its passing through the given production step can be confirmed [9].

To collect information on the state of separate production devices, sensors scanning movements, temperature, pressure and other technical parameters can be used. These data can be used for the analyses focused on

optimizing the production process and debugging separate devices, as well as for planning well-timed maintenance, which will help to prevent from possible failures [10].

8. CONCLUSION

Prior to proper choosing and implementing an information system for production tracking system within operative evidence, it is necessary to define requirements for this system, condition for data gathering and data structures. These requirements will be different depending on type of the production process and type of the manufactured products.

Part of these requirements and conditions are:

- Define work centers where we will track production and gather data.
- Define product detail for which we will track production.
- Define time interval for production tracking.
- Define requirements for reporting.
- Define methods and technical solutions for automated or manual data gathering and evaluating benefits and costs of such solutions.

Based on these requirements and conditions, the supplier of this system, thus, will be able to propose appropriate customization of information system for data tracking and data gathering including required data structures which will be saved in the databases for reporting and later analyzing. The information system then can track both data on the running production and data describing the state of particular devices. The obtained information can be consequently used for the optimization of the production process and for planning maintenance of separate devices.

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