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## USE OF MONITORING SYSTEM IN THE PRODUCTION PROCESS

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**Abstract:** An essential step in this process should be made aware of the risks, the identification and analysis. This awareness is the first step towards the preventive measures taken to minimize risks and prevent such potential crisis phenomena in production. The current situation in all the European and world markets is that firms have to operate at full throttle and able to produce competitive products with low price and good quality. Companies still have to invest a lot of money to innovate technology park and marketing in order to remain on the market.

**Keywords:** monitoring system, technological arrangement, Layout question

### INTRODUCTION

Production is business activity, within which to transform the inputs into outputs, creating a final product that is a finished product. In the process of production is the creation of material goods to the company to ensure coverage of production costs and their own profit. Business in manufacturing is very diverse activities. Each product and therefore each manufacturing process require other technologies, procedures, other material, technical and personnel support. However, regardless of the technology used in each production process there is a potential for the existence of a risk. As in other areas of social and economic life, and in the production of the tendency to ongoing modernization and improvement of the production process. These trends are realized through automation and robotics manufacturing.

Simultaneously with higher levels of technology, machinery and equipment is increasing but also the level of risks that follow from them. In addition to efforts to manufacturing plant to achieve the greatest profits take the best place in the market and secure the long-term prosperity, it is necessary to focus our attention on the risk aspect of production. An essential step in this process should be made aware of the risks, the identification and analysis. This awareness is the first step towards the preventive measures taken to minimize risks and prevent such potential crisis phenomena in production.

### MONITORING THE PRODUCTION PROCESS

Monitoring is an important part of the manufacturing process, which streamlines. The monitoring system is beneficial not only for the management of the company,

which receives regular reports from the production, but also for the actual use of machines having the imaging located nearby to-date information (production plan, number of units, number of units yet to be produced, etc.). The production plan is entered to the display via a web application that is accessible from the designated points on the local network (access is protected by username and password).

Today clearly stands out interested companies reduce costs, increase efficiency and profitability of work. Manufacturing enterprises are under increasing pressure to reduce production costs. More are forced to optimize their production processes and increase productivity of manufacturing processes, people and material. This is reflected in high demands on the manufacturing management in terms of management and production planning. For the right decision, it is necessary to have information on the critical points in production can know the real production capacity, various downtime and losses arising under specific conditions and combination of different variants. This can be achieved only on the basis of a good overview of all parts of the workforce. In any production losses arise which make it impossible to achieve the maximum possible theoretical performance of production and maintenance.

The monitoring system allows not only to collect data from the production (information on whether the machine is or is not in service, the number of units and the like.) As well as report a variety of disorders. This function can be implemented using special controls called switchbox. Faults can be displayed on the central panel. Another option is sending messages Fault



designated group of workers via SMS or email. Of course there is audio-visual fault signaling directly on the machine. This feature speeds up troubleshooting and streamlines the entire production process, figure 1.

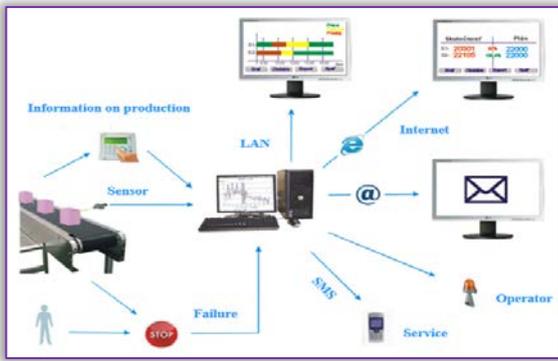


Figure 1: Signaling directly on the machine

An important part of the system for monitoring the production of the display device. The most commonly used combination of resistant LCD and LED panels. LCD panels are used for shorter viewing distances (designed primarily for operators). As a central display that includes comprehensive information on production, it is appropriate to use a large LED panels because they are read to tens to hundreds of meters, which is on the premises of large production halls welcome feature. The source signal can be any PC equipped with a video output if necessary the panel may be provided with its own control unit connected to the computer network company (including WiFi), where it will automatically draws data on the display -eg.from the corporate information system. If within the system and obtain the necessary information, it can be assembled viewer and controller easily supplemented by enabling data input terminals of any production site. These terminals can be either simple, with few buttons to manually enter information service, or can be equipped with its own small computer screen and barcode scanner or RFID tags to complex input, if necessary fully automatic, linked by means of sensors and channels of communication directly to a production facility. It drives the system not only displays information but also to collect and report processing.

### THE BENEFITS OF MONITORING THE EFFICIENCY OF PRODUCTION

Monitor the effectiveness of production is a tool that helps the company management to monitor and evaluate manufacturing processes within the company. It helps to analyze weaknesses and reserves. Of course, some loss of production and maintenance cannot be completely removed, but the great majority of these have influence. Monitoring the effectiveness of industrial machines, the system is focused on the production process, from which it receives information leading to the possibility of improving its profitability. It provides a better overview of production, downtime and

its causes, the performance of the machine and the operator.

The production monitoring, product performance machines and their use of time is used for operational monitoring and evaluation:

- ≡ production and productivity of the machines, plants,
- ≡ finding reserves and savings opportunities,
- ≡ the work of individual professions,
- ≡ the work of individual employees with the possibility of creating a payroll service,
- ≡ moving the products on a production line
- ≡ various stages of production
- ≡ failure of machinery, evaluation repair service.

Tracking system offers advantages like efficiency:

- ≡ determining the actual performance of the machine by means of objective indicators obtained,
- ≡ the pursuit and achievement of the required system parameters and workload,
- ≡ recognizing the potential to optimize production through increasing transparency,
- ≡ extension of trouble-free operation of the machine by means of targeted measures for the evaluation of the production cycle,
- ≡ quick response to faults or organizational shortcomings on the basis of evaluation of the state machine,
- ≡ shortening times to repair equipment during maintenance, due to the rapid acquisition of the causes of failure.

Monitoring data, conditions:

- ≡ manufactured product,
- ≡ number hassle,
- ≡ length of downtime,
- ≡ length and type of fault,
- ≡ speed of response services,
- ≡ consumption monitoring computer time, man-hours and other costs.

Evaluation - a variety of data analysis and evaluation:

- ≡ worker at his machine sees the size of its production,
- ≡ production manager has an overview of the production flow and provide an overview of the reserves,
- ≡ reports for managers,
- ≡ daily production statistics interim results,
- ≡ materials for creating real and preliminary calculations,
- ≡ the current situation can be viewed through a corporate network or the Internet,
- ≡ outputs can also be effectively used in the calculation of wages.

Inputs to the system:

- ≡ automatic processing status monitoring / sensors via contactless identification elements,





- ≡ manually enter information into the system, for example. position switch,
- ≡ manually entering the monitored state through the operator panel / creating databases,
- ≡ through barcodes.

### **MANAGEMENT OF WORK IN PRODUCTION AND POSITION OF MAN IN PRODUCTION**

The labor force is the decisive factor in active production. Its role is further enhanced in the context of the technical-scientific development, leading to the growth of mechanization and automation of manufacture and with regard to the equipment of the worker to the growth technique. The sum of all input elements of production, however, is only the possibility of achieving a useful effect. Obtaining factual effect depends on the level of skills and abilities of individuals. Production automation, using computer technology, new technology and rapid product innovation leading to increased complexity of the work required and therefore to the ability to mobilize human. Placed on the workers of cell new requirements such as the ability to adapt to changing conditions, occupational mobility, the ability to upgrade their skills or retrain. It turns out that the development and use of qualifications are equally or even more important factor for development as an investment.

Competition requires continuous improvement of production and the products and reduces costs. This is possible only with the active participation of all workers in improving the work of the company. To ensure high production efficiency has a significant potential increase in activation of the human factor. Factors influencing the activation of the human factor in production are mainly educational system, social conditions, work incentive system and work management. Increasingly complex and very expensive production systems require paying attention to issues of human reliability in the system of human-machine- working environment. Practice shows that man is the most important, but also 'the weakest link in the system. Reliability of man lies in his ability to perform the required tasks (functions) with the requisite accuracy at the time and under the given operating conditions.

Reliability man is given by the probability of faultless work. Failure of man consists in full or partial incapacitation and may be due to internal causes (eg. Non-registration of change of incentives, poor identification initiative, unresolved complaint ignorance of the correct response to a stimulus) or external causes (eg. Unergonomic addressing machine, inadequate working environment etc.). It is necessary to examine the causes and consequences of human failure and to seek ways of increasing its reliability. Increase human reliability it is achieved mainly: removal of ergonomic machine failure, optimizing the working environment

and working methods and the introduction of mechanization and automation of production. Human reliability issues are mainly in modern productions of great importance and economic security. Therefore they should be given special attention. The issue of employment is engaged in a number of sciences work, including in particular psychology of work, sociology of work, labor economics, labor law, ergonomics etc. Production management, which is an important part of the organization of work, must be used the knowledge of all these disciplines.

Work organization is looking for the optimal alignment of human activity and technology in production so that the working and material resources were best used to achieve a high production efficiency and to ensure the protection of human health. Labour Organisation assumes that determines the appropriate qualitative and quantitative proportions between different types of work, the choice of an appropriate division of labor and cooperation.

The division of labor is a division of work on certain parts that are attributed as workloads work teams or employees. Cooperation work is to be bonded sub-part of the working process in individual work processes being coupled in various sectors of work, resulting in the final product. Both as a division of labor as well as cooperation work interact. The division of labor has a significant impact on the production structure of the company, qualifications and profession personnel structure as well as the number and composition of work. Cooperation and division of labor depends on the development of techniques and technology. A degree of development and technology conform to the appropriate division of labor and cooperation.

### **CONDUCT A WORKPLACE LAYOUT**

When we know what we produce, we have to rethink what we start. Each unit can be broken down into groups, subgroups, parts to components. At the same time the simplest element in the product made from one piece of material or blank. It is part of several connected components. Sub-group consists of a number of parts and components. The group is composed of several sub-groups, as well as parts and of the parts, and the like and the whole is made up of several groups, and individual parts and components. Such a breakdown product is best represented graphically, so to see follow-up of production processes. Also shown is said assembly diagram of the product. Furthermore, the technologist estimates or calculates the duration of each procedure of the assembly diagram. All this then recorded in a chart of line, wherein the bars represent the different duration. The Explodes into line graph is a tree-like branched, so it is called herringbone diagram. See Opinions timing of the production in an arbitrary unit of time. The spatial structure of the production system is



formed by determining the proportional relationship between elements of the system particularly with regard to forms of working arrangements, funding, and distribution of labor resources, labor and objects of labor, the relative distribution of production and other areas necessary for the implementation of the production process.

Proposal spatial structure of production is thus technological - organizational solutions of the production process in a limited area with respect to a given range and volume of production. We must in fact take into account the particular conditions:

- ≡ High-quality, cost and timely production.
- ≡ Ergonomically correct.
- ≡ Easy control and process control.
- ≡ Easy and economical handling of materials, tools, waste.

In practice there are two basic types of spatial structure of production:

- ☐ Technological arrangement – consists of clusters of technology jobs to the resort by common technologies (eg. lathes, to lathing presses to mill etc.). Technological arrangement is characterized mainly universality (exchangeability machines and flexible adaptation to changing production program) and therefore applies especially to we produce, figure 2.

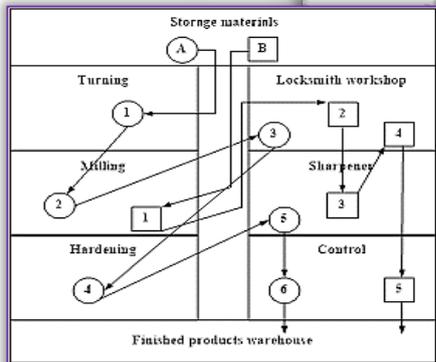


Figure 2: Technological arrangement

- ☐ Layout question – is also where the relevant space technology behind grouped by subject produced during a particular operation. Objects of arrangement is particularly characterized by its purposeful specialization (short interim period, and easy management of production at the cost of higher investment costs and the difficulty of change in the production program) and therefore applies especially in the field of higher series. It can be said that it is preferably the one method, the disadvantage of the other and vice versa. Decision should depend on the production program and production volumes, figure 3.

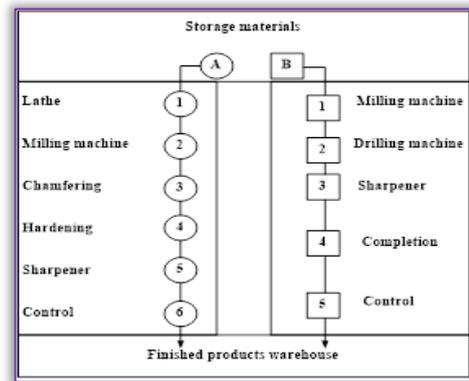


Figure 3: Layout question

## CONCLUSION

After short-term operational experience with a well-designed system of collection and presentation of information from production appear before the first results in the form of improved continuity of work, improving production quality and to reduce outages due to breakdowns or restrictions in some parts of the production chain. In addition, such a system could become one of the elements of an integrated monitoring and control system of the company, it combines information on production status and production facilities and make them as data on energy consumption, enabling the design of measures to achieve savings while maintaining the volume and quality of production.

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