

Секція 1  
*Особливості підприємництва у сфері матеріального  
виробництва*

**DIAGNOSTICS OF PRODUCTION PROCESSES: METHODS, TOOLS,  
SPECIFICS OF THEIR APPLICATION**

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The initial stage in preparing for decision-making and their subsequent implementation is the diagnosis of the current state of the enterprise's production subsystem. When evaluating and analyzing production, it is necessary to pay attention to the efficiency of resource use, the organization of all processes, and the relevant information flows.

All elements, both productive and unproductive, that is, those that actually represent losses, should be taken into account.

For example, elements such as storage or search for necessary materials, tools, and information are not always included in the analysis because they are not directly related to production processes, but this is where significant reserves are often concentrated.

When diagnosing production processes, information gathering usually begins with a review of the company's existing reporting and documentation. It is necessary to analyze the existing production capabilities. Already at this stage, it is possible to assess the following aspects:

- 1) availability of unused space/equipment;
- 2) the share of obsolete and physically outdated equipment in the total equipment fleet
- 3) maximum productivity of the production system;
- 4) discrepancies in the productivity of individual elements of the system. It is possible that one of the sites has a much larger amount of production capacity that cannot be utilized because the productivity of the previous or subsequent sites is lower. This, of course, leads to downtime.

To collect statistical information, it is possible to use special automated systems such as automated process control systems (APCS), which allow to automatically collect information about production processes and the interaction of various production subsystems without the involvement of employees. Often, such systems are included in the modules of MES (Manufacturing Execution System) systems. However, as mentioned earlier, attention should be paid to those elements of production that may not be taken into account by these systems, increasing the duration of the production cycle and the cost of manufacturing. Therefore, it is not yet possible to completely eliminate manual collection of the necessary information.

The next stage of the analysis is to study the structure of work in terms of time. The most relevant tools are:

- flow map;
- a photo of working hours.

These tools are similar in content, their difference is in the different “research focus”. Thus, while the object of observation in the analysis of the flow map is a product/service, the object of observation in the application of time photography is a workplace or an employee.

During the observations, all time spent during the production cycle (in the case of flow map analysis) and during a certain period of work (in the case of time photography) are measured without exception. As a result, you get an accurate snapshot of what exactly happened to the product or what a particular employee did and for how long.

The duration and cost of each process and sub-process can be determined. This provides the basis and data for functional cost analysis, the next step in the study of the company's production processes.

Functional Cost Analysis (FCA, Activity Based Costing, ABC) is a tool that allows you to estimate the actual cost of a product or service without reference to the organizational structure of the company. All costs, direct and indirect, are allocated to products and services based on the number of resources required at each stage of production. The activities performed at these stages are called functions (activities).

After using the above methods and analysis tools, sufficient information is available, both statistically and visually.

Next, it is necessary to determine the focus of future efforts. The following methods are most suitable for this purpose:

- ABC-analysis;
- bottleneck analysis.

As a result, it is possible to form the focus of future efforts. First of all, close attention should be paid to those processes that require significant costs and take a lot of time.

It is important to note that the considered complex of diagnostic tools should be a unified system, because non-systematic application of various methods and tools does not allow obtaining qualitative results. All components of the proposed complex effectively complement each other, which gives a significant synergetic effect. Thus, flow map analysis and working time photography provide the necessary information to build an up-to-date map of production processes in the form of IDEF-model. The Gantt chart allows visualization of production processes, which greatly facilitates perception. These elements of the complex cannot be effectively used without the previous stages of analysis. Functional-cost analysis will be much more correct if there is an IDEF-model. The obtained picture in this case will correspond to reality to the greatest extent. Application of ABC-XYZ analysis and bottleneck analysis gives an opportunity to choose the best directions of future efforts, which will provide the most tangible effect at other equal costs. Ishikawa diagram allows to reveal the essence of

deficiencies, which makes it possible to really solve the problem, rather than to work exclusively with its external manifestations.

Thus, all the elements of the presented diagnostic complex are closely related to each other and are built in a clear sequence of their application. The implementation of this set of methods and tools of analysis gives the enterprise management an opportunity to identify reserves and focus its efforts on the most significant problems.

## **THE STATE OF OIL AND OIL PRODUCTS POLLUTION OF THE CASPIAN SEA IN THE TERRITORY OF AZERBAIJAN**

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As it is known, environmental problems arise during the search for oil fields in the Caspian Sea, its extraction, and transportation. First of all, referring to the technical literature dedicated to the extraction of oil in the sea, it can be said that the organization of the mining industry in sea conditions, the exploration, and the drilling of exploitation facilities is a very difficult and complex process. Despite this, in the Caspian Sea, a large number of oil fields have been organized, in the field of application of high technology, exploration and exploitation work has been carried out even in the deep areas of the sea.

Between 150 and 1,604 tons of oil can be spilled into the sea each year, depending on the amount of oil recovered from the sea and the loss assumed. The surface area of the Caspian Sea is 355-400 thousand km<sup>2</sup>. 12.3 thousand tons of oil is enough to completely cover its surface with a monomolecular oil film. Sometimes the amount of pollutants is so high that the sea is unable to break down and neutralize all the pollutants poured into it through its natural self-purification process. In such cases, the amount of decomposed and not neutralized substances in the sea increases every year, weakening the self-cleaning process of the sea.

Terrible hydrometeorological and ecological conditions arise when one-time and long-term oil products are spilled into the sea as a result of accidents. In such extreme cases, measures are prepared and implemented for the neutralization of oil and oil products spilled on the sea surface. This is done by collecting oil products from the sea surface or by applying certain chemical reagents.

Although the importance of keeping the Caspian Sea clean is confirmed by all the Caspian states, it continues to be polluted as always, and the main place in this pollution is oil and oil products, followed by chemical pollution.

Based on the observations, it can be said that chemically treated and barite-weighted clay solutions have destructive effects on fish and invertebrates that are their