

IMPROVING THE MANAGEMENT OF TECHNOLOGICAL PROCESSES IN THE FIELD OF CONSTRUCTION MATERIALS PRODUCTION

ANDREI MAGYARI¹, AUREL PETRESCU²

Abstract: It is presented the research methodology using the existing informational system in enterprises for the mathematical modeling of programming the assimilation activity of the new products as well as ways and solutions of projecting and upgrading this, in a modern and unitary conception. Thus, it is presented the place and role of the informational system, the projecting stages of information flow, analysis and projecting methods, flows and informational circuits' studies from the enterprises. It addresses to the managers of enterprises from the building materials industry, to engineers and economists. It is emphasized the role of the research and development function in the evolution of the enterprise and the superior quality of the operations made using the calculation technique.

Key words: improving, management, construction materials

1. GENERAL PRESENTATION

The most challenging question to which the business leaders and managers must answer in this new millennium is not "How could we succeed?", but "How could we succeed from now on?".

Today's business world offers the vision of a succession of enterprises, leaders, products and even industries that live their "15 minutes of glory" and then disappears. Even the powerful companies like IBM, Ford, Apple, Kodak and many others are passing through dramatic cycles in which they are almost collapsing and then reviving. It is like playing the roulette - customers' tastes change, technologies, financial conditions and competitive activity fields are changing very fast. In this highly risky environment the need for ideas on how to get on top, to stop the roulette (at the lucky number, of course) or to foresee the next change is more and more present. New great answers are almost as frequent as the new formidable companies

¹ *Professor eng.Ph.D. – University of Petrosani, magyari.andrei@gmail.com*

² *Eng.S.C.ELPRECO S.A.Craiova, aurelx15@yahoo.com*

that appear on the scene.

Using the latest technologies and the newest projecting and implementing techniques of the computer conducting systems of tracing and planning the production, buying raw materials and selling activity, to an enterprise it is offered a solution to the dynamic requirements of the present economic and financial context. The main goal of a computer conducting system is to allow active control over the production and administration medium of the enterprise, thus increasing the effectiveness and profitability of the enterprise. Fulfilling this goal is based on the production conducting system's architecture as well as and on its vision on the administrative medium of an enterprise, presented in figure 1.

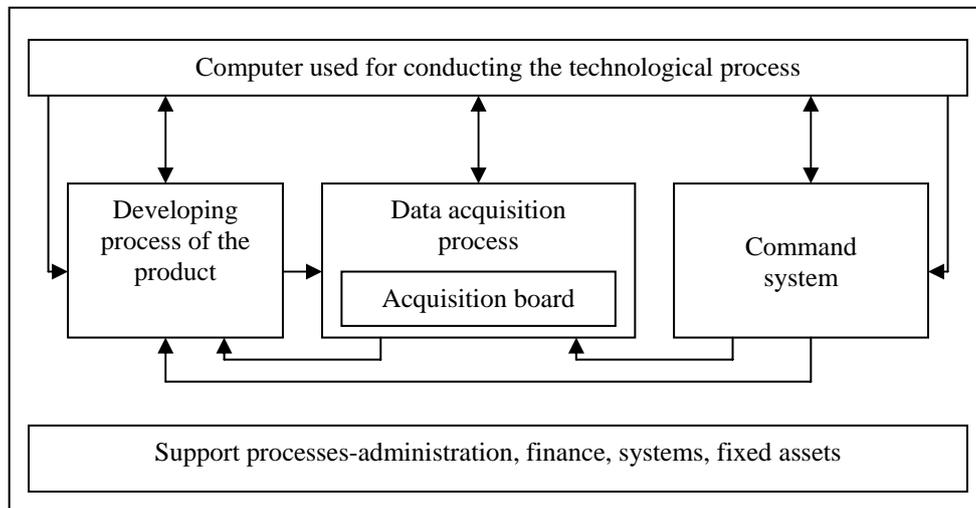


Fig. 1. The production conducting system's architecture

Starting from the desire to model the production medium of an enterprise with the greatest accuracy and to offer flexibility on the more and more often changes of the context in which an enterprise evolves (economic, financial and social) and benefiting from the support offered by the latest technologies and projecting techniques, a system which easily maps on the specific requirements of an enterprise can be developed. From this point of view, the system is organized on two levels, the first one representing the definitions of the concepts and the interaction between them, and the second one continuing the operations which can be made with these concepts, for implementing the existing processes in the enterprise.

A distribution of the improvement system on modules with the main elements is presented in figure 2.

The computer conducting system, through the presented modules, helps strengthening the planning, production, selling and marketing efforts of a company, uniting them in a single management system. This tends to integrate all the departments and all the functions from the entire company in a single computer

system, which can respond to the needs of all those departments, along with increasing the productivity and profit of the company.

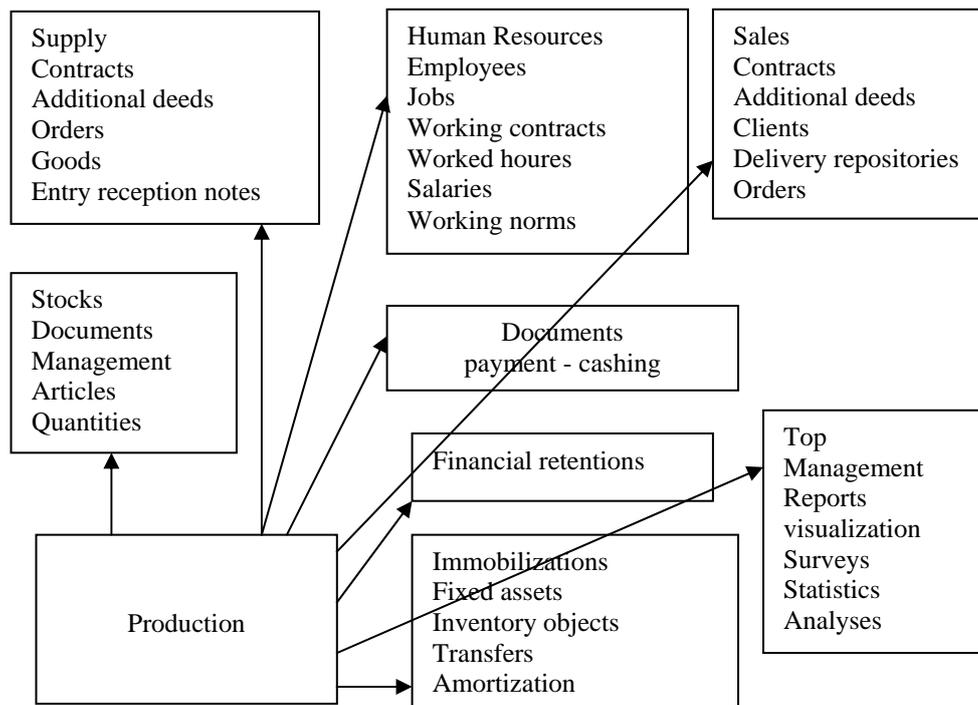


Fig. 2. The distribution of the improvement system on modules

2. MODERNIZED PRODUCTION PROCESS CONFIGURATION

By analyzing the activity from a production company, we observe the central role of the production activity in figure 3. It is seen as an engine that tows all the other selling, supplying etc. activities with the main goal of improving the financial situation of the company.

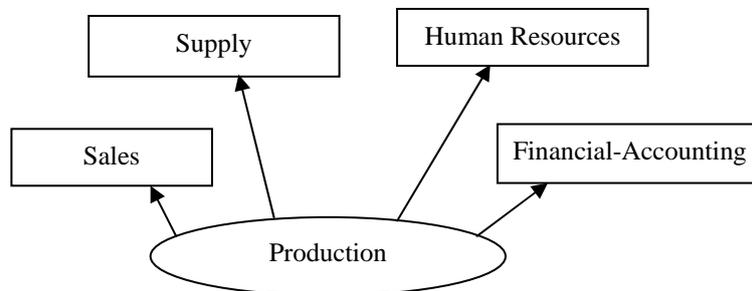


Fig. 3. The central role of the production's activity

Regarding the improvement of the production management activity in an enterprise, looking at it from a hardware point of view, we distinguish two components:

a). The computer conducting system of the production process, which assumes the following components:

- switching, procrastination, action systems, transducers, flow meters, humidity; transducers, strain doses, temperature transducers, limitation etc;
- relays systems for executing different sequences of the technological process;
- interconnecting cables system;
- acquisition boards installed on the process computers;
- application installed on the process computer.

Process computers, databases' servers, computers for data collection with reference to sales, marketing, supply, human resources, fixed assets etc are bounded in a network for jointly using information and:

- are organized in a master-slave system;
- assure fast exchange of information;
- have process computer or economic, financial etc destination;
- have different roles, depending upon the way in which they are configured.

A computer network represents a way to interconnect several independent computers in such a way that several resources can be used in common: databases; acquisition boards; disk units; files; printers; communication equipment.

The network offers many other advantages such as electronic mail and methods of using information in common through monitoring the activity of a computer. Process computers and those with workstation destination connected to the network are called nodes.

b). The old technological system is made from machineries, production lines, command and surveillance systems, transportation systems, loading systems etc.

The production process implies:

- numerical command emission to the machinery involved in the production line;
- receiving logical or analogical signals from the machineries;
- processing the information for placing in the normal technological parameters;
- decisions for continuing the production process.

Sizing the equipment, setting the place in the production chain, setting the optimal routes for obtaining the final product, choosing the raw materials and setting different disruptive factors, human factor etc, are defining coordinates in upgrading the production process.

All these factors interact in order to obtain the final product, such as it is presented in figure 4.

The resulted production after using the raw materials is the result of the practical activity that shows the evolution of the enterprise.

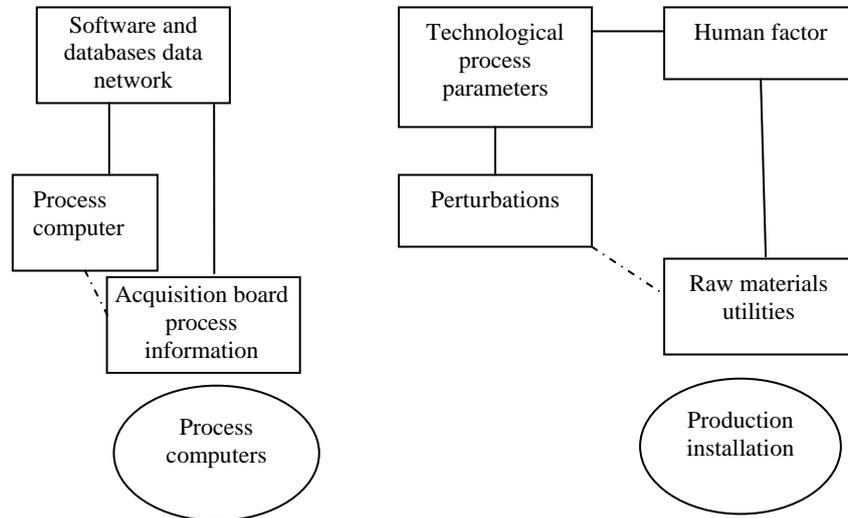


Fig. 4. The interaction of factors in order to obtain the final product

From a structural point of view, the modernization of a technological process which can be successfully exploited in such a way that it has to respond to all administrative requirements of the production process, production’s analysis, consumptions, expenses with the work force, other expenses; must include modules that:

- receive information concerning the situation of different machinery
- send commands in the technological process
- make decisions in the technological process
- save all these information in a database offer information to those involved in the enterprise’s activities.

These criteria are presented in figure 5.

The general factors of the objective “New process” in figure 6.

Designing stages of the modern manufacturing process are presented in figure

7.

3. MODERN MANUFACTURING PROCESS’S ANALYSIS

3.1. New products development

A products company using computer projecting techniques and computer conducting process can offer a greater flexibility and a faster cycle to one of its key production units. In this factory are constructed more specialized products on a single production line. Because each client’s order could needs adjustments at machinery level, now everything is reduced to changing some parameters and thus technical changes –which are critical- are avoided. Working by aligning the needs of the customers, product projecting and process specifications, the need for technical modification on the production line has been dramatically reduced. The enterprise

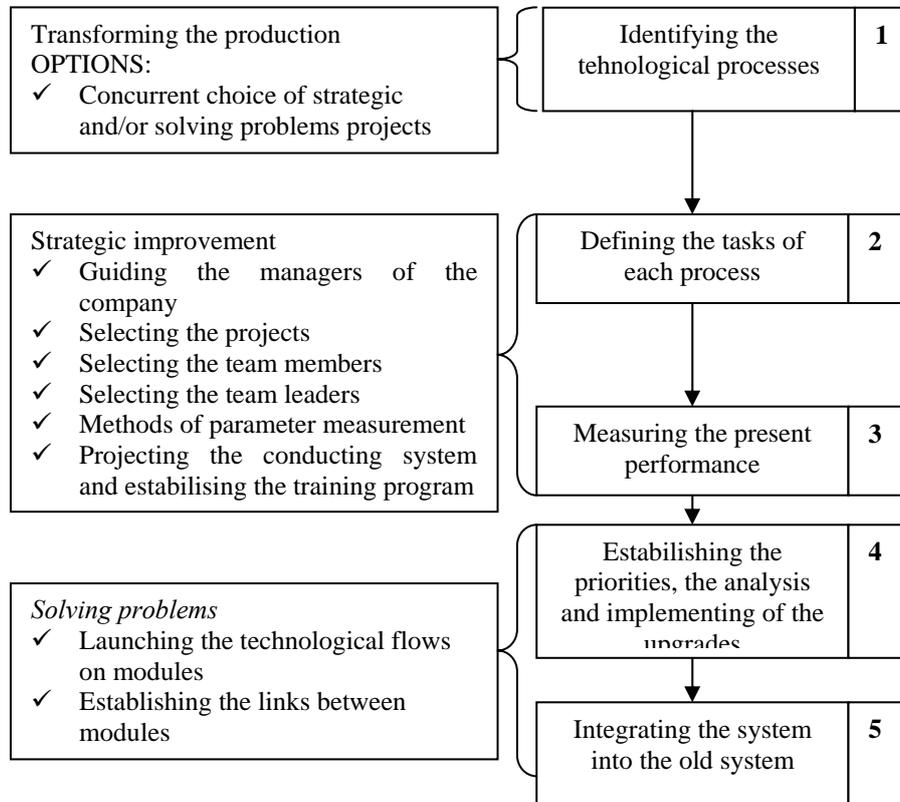


Fig. 7. Designing stages of the modern manufacturing process

With the new enterprise projecting, customers' orders can be sent electronically, "virtual projecting" being used for hastening the response speed. All these changes improve general work times from days/months to hours or even minutes, at the same time increasing the productivity and improving resources' management.

Work flows and evolving procedures. - When a change is made in a production process, usually some work is needed: things are starting to work, the raw materials are sent to different places, the equipment and procedures are changed. For this reason, changes in production processes are discussed and deliberated a lot in comparison with others.

3.2. Offering a prompt response

The emphasis is on two objectives:

1. reduction of the average time response
2. percentage increase of the technical problems and questions resolved in a "centralized and simplified" system, in a minimum time response.

3.3. Thinking out of the black box

By focusing the projection of processes on the clients' needs and on adding-value activities, production operations are flexible starting with raw materials and ending with the final product from the repository. Only the economy made with the wrapper represents a significant percentage from the entire production process, but there are also obtained major improvements on time delivery:

- Generates a sustained success
- Establishes a purpose for everybody
- Increases the value towards clients
- Accelerates the improvements' rate
- Promotes learning
- Executes strategic change

The instruments that are a result of conducting the production with the process computer are presented in figure 8.

- Electronic commerce and services;
- Planning enterprise's resources;
- Permanent production without problems;
- Management systems of relationships with clients;
- Knowledge's management;
- Management based on activities;
- "Organization centered on processes";
- Globalization;
- Invy/production "just-in time"

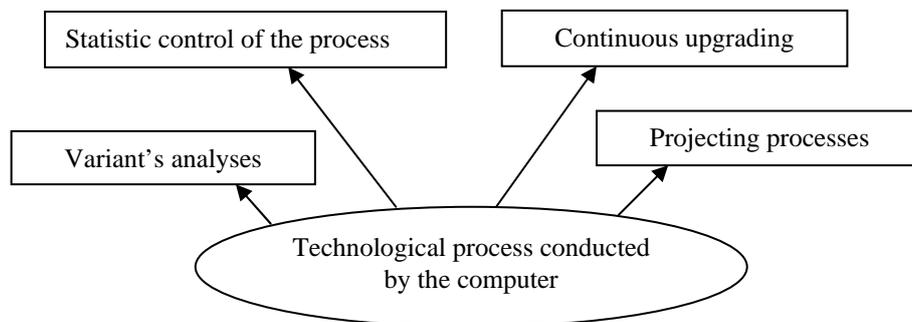


Fig. 8. The instruments for production with the process computer

On the left side are placed the process's (or system's) inputs; the organization or even the process (described as a map or a process diagram) is in the middle. On the right side are placed the customers, the final products and (let us hope) profit, all elements being very important.

In figure 9, we introduced some letters, which represent measures or "variables" in different points of the system.

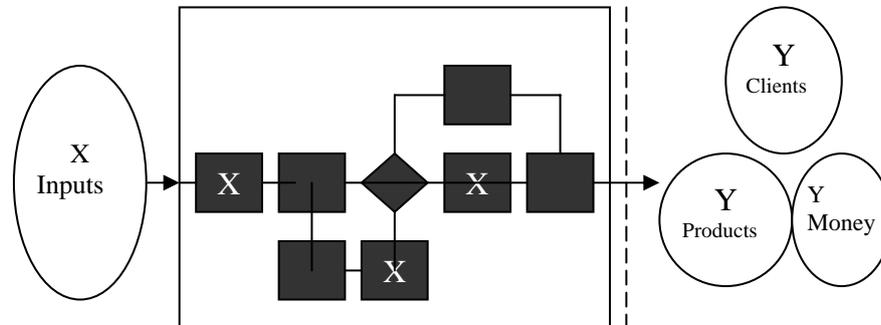


Fig.9. The introduction of some variables in system

The Xs, which appear at the inputs and at process diagrams, will represent indicators of the change or performance in the “initial” part of the system.

The Y symbols from the right represent indicators of performance in business-similar to the final score of a game.

The formula $Y=f(X)$ is just a mathematical way of saying that the changes or the variables in inputs and in system’s processes determine the final score-those Ys.

Organization/process:

- Y may mean:
 - strategic objective;
 - clients’ requirements;
 - profits;
 - general efficiency of the company
- X may mean:
 - essential actions meant to fulfill some strategic objectives;
 - work’s quality;
 - variables of processes such as : recruitment, process cycle’s time, needed technology etc;
 - inputs’ quality in the process (from clients or suppliers);
 - key influences on clients’ satisfaction

With the exception of measuring the parameters in computer networks, that are stocked in databases collected from the acquisition boards of the process computers and in information centers, for process managers connected with the production it cannot simply be putted in operation a machinery to measure all the required indicators. For example, one of the designers’ works at the final part of a flow process for processing the raw materials needed for a product. He discovers that tens of people have independently verified and tried to solve the problems with the raw materials of the product, resulting in a significant amount of effort and time consumed. However, correct measurements of the time and the costs of reprocessing and of redundancy is difficult, since these tasks represent a small ratio from the big number of working days of different employees.

4. IMPLICATIONS OF MODERN PRODUCTION PROCESS IN THE EVOLUTION OF AN ENTERPRISE

Economic levers that allow productive activities developed in an enterprise, frequently used, are categorized in five big directions:

- setting the production made in a period of time
- setting the consumption level related to the production
- setting the standardized consumption level related to the production
- setting the quantity and value of the stocks
- the calculation report of the optimal consumptions depending on the real consumptions and the standardized consumption levels

In order to respond to these requirements in the changeover process of a company by modernizing the technological processes, a series of objectives must be fulfilled; some of them are mention in figure 10.

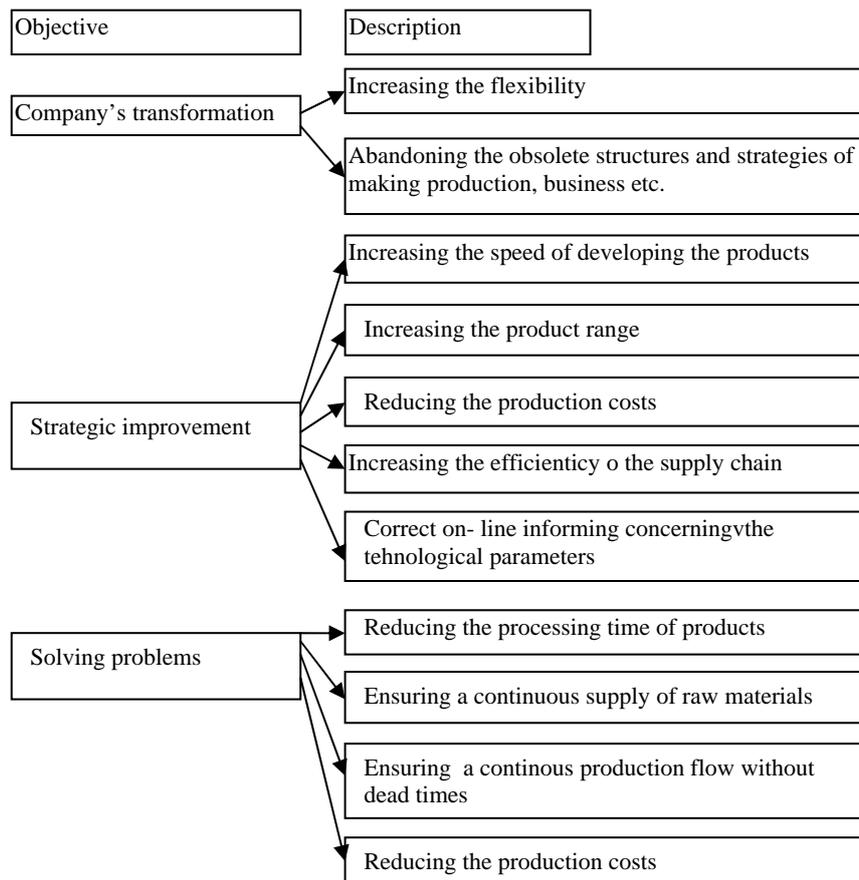


Fig. 10. Changeover process of a company by modernizing the technological processes

Because there is an unprecedented competitiveness in the raw materials market, an awareness of the level and structure of the production, of the consumption levels is much needed. Likewise, the orientation of the actions towards eliminating the consumptions especially with those elements that have a large share is very important. The profitability of the enterprise grows with the decrease of the consumptions and this is achieved with new technologies that diminish the production costs. An informational flow led by the process computer is presented in figure 11.

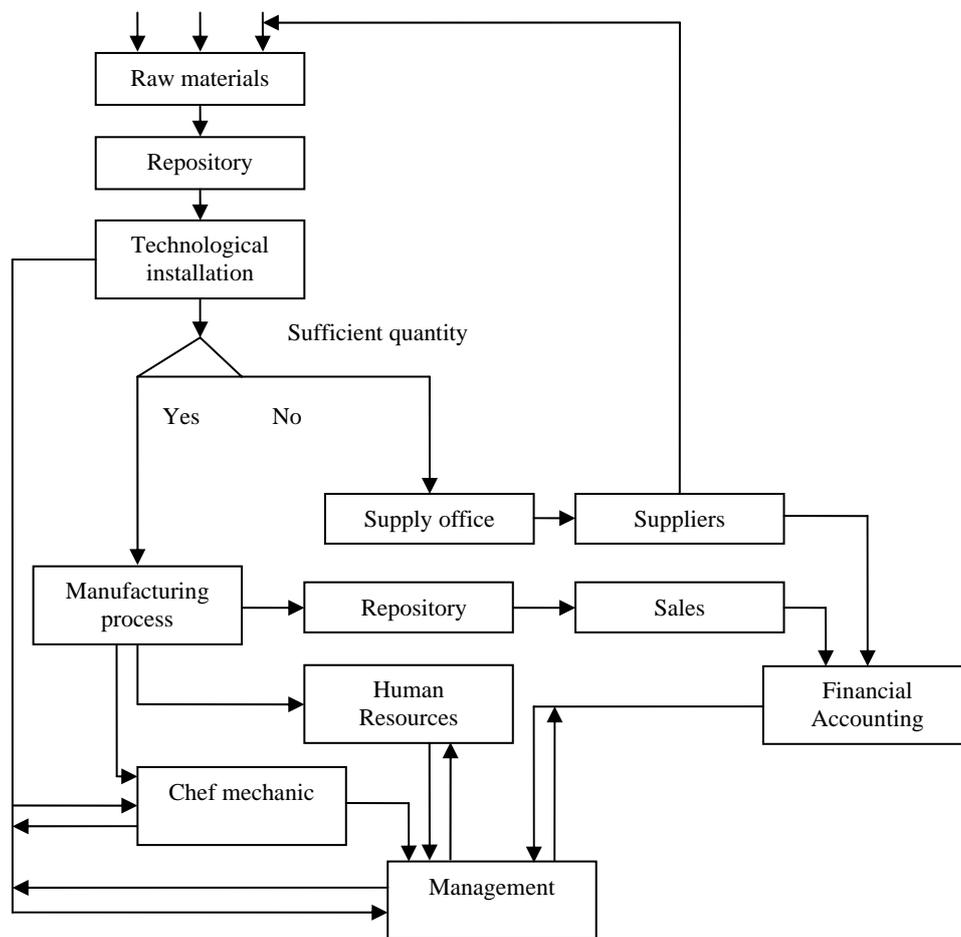


Fig. 11. Informational flow led by process computer

We can observe the conditional links between the process computer (default, the technological process) and all the departments that a factory which produces construction materials has. This represented flow starts from the moment when the factory is supplied with raw materials necessary in the production process, establishes the necessity for supply and the quantity of materials from the repository which are to be sold. Moreover, through the database are established reports and necessary data to

all the functional compartments.

5. CONCLUSIONS

The strategy of conducting the industrial process should be established so that some objectives that are transposed through values of the technological parameter are assured. Thus, the computer conducting process should assure the proposed objectives at the production management level. The process is equivalent to technologies, equipments, machineries and labor force used within the frame where the production is developed. All these equipments execute and process the commands given through the execution elements and the acquisition boards by the conducting system at the industrial process level and by the surveillance and management of the process team.

The automatic conducting system's functioning in case of industrial process is dictated by a series of algorithms used for processing the information, initially following the reduction of the deviation from the real values of the process parameters towards the prescribed values of these parameters in a restriction of time, costs, etc. situation. These restrictions are imposed by the supervision system or by the medium requirements imposed when working. The presence in this structure of the feedback received from the transducers from the process assures the informing of the conducting system regarding the appearance of the deviations in functioning towards the initial planned evolution. These deviations are caused by perturbations, which act randomly, or by the failure to respect some transmitted orders caused by the improper functioning of some elements or by process equipments.

The analysis appears as an indispensable instrument in the knowledge process in any field, as it allows setting the structure of phenomena, of causality relationships, of generating factors, of their forming and developing laws, which constitutes the formulation support of the decisions concerning the future activity.

REFERENCES

- [1]. **Birlea, S.**, *Initiation into industrial cybernetics*, Technical Publishing House, Bucharest, 1975, (Romanian language)
- [2]. **Calin S., Belea, C.**, *Complex automated systems*, Technical Publishing House, Bucharest, 1973, (Romanian language)
- [3]. **Magyari, A.**, *Mechanical installations for underground use*, Technical Publishing House, Bucharest, 1990, (Romanian language)
- [4]. **Petrescu, A.**, *Accountancy on PC, book 1*, Intarf Publishing House, Craiova, 1995.
- [5]. **Pisau, G.**, *Development and implementation of informational systems*, Technical Publishing House, Bucharest, 1976, (Romanian language)
- [6]. **Puiu, I.**, *Organizing the management of companies*, Scientific Publishing House, Bucharest, 1970, (Romanian language)
- [7]. **Russel, C.**, *All about Windows Server 4.0.*, Teora Publishing House, Bucharest, 1997. (Romanian language)
- [8]. **Vanatoru, M.**, *Management of projects*, Universitaria Publishing House, Craiova, 2008. (Romanian language)