

# Elements of the efficiency system improvement of foundry

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## Abstract

The effectiveness of industrial systems is being ranked among important factors industrial engineering in foundry. He determines internal production abilities of foundry. It is possible to describe the effectiveness the measure of matching closely possibilities maximum number of products for definite quality standards, at the optimal use of production factors and with the application the best methods pouring out. The second worship of article is devoted to problems market supply casting products. They discussed comprehensive you will eat a little of processes supplying.

**Keywords:** Planning, Economy, Foundry, Sand, Cast Iron Scrap, Supply, Ecology, Environment

## 1. Introduction

Under the notion industrial processes we can conclude production processes taking into account technological, transport, test action and stock, all the way to handing final goods over inclusive [1]. These processes are taking into account treatments and activities appearing in particularly a requiring and responsible heavy industry.

In the classic theory of efficient and effective effect industrial organization the particular emphasis is being put on strategy which is acting to the market structure, through implemented innovations in production of casts, alterations of internal structure organizational and production process (of the given production line) and adaptation of prices finished goods to the current situation recipient. The corporate strategy largely also depends from the production structure, individual, serial or mass.

As root causes of the low efficiency of organizations an imperfect labour organization and insufficient justifying employees are being listed in desired direction for organizations. Both these problems are uniting closely with themselves. To these two problems which in fact are connected with the human factor, is overlapping each other third a technical infrastructure is which

(machines, devices, etc.). In the technical meaning is more excellent on account of the ceaseless technological progress which is being divided to technological and organizational.

Technological progress is appearing within processes and products – it is a more good technique, being applicable to more excellent machines, manners of work, better and new materials. Efficiency organizational, determining the effectiveness, is essential, but the primary importance for the development of enterprise has organizational progress, because he determines effectiveness [10].

The effectiveness of industrial processes is one of important factors industrial engineering in the foundry. It is factor determining internal production abilities of foundry. It is possible to describe the effectiveness, measure of matching closely possibilities maximum number of products for definite quality standards, at the optimal use of production factors and with the application best methods pouring out.

The effectiveness is settling on the basis optimum norms techno – economic, determining real maximum use of machines and devices and the production area, at considering the best conditions of litigating production and organizational of work. At calculating the manufacturing capacity up to the attention only buildings of departments the basic output are being held, however

remaining should guarantee only a correct preparation and the service of the main production process. In calculations buildings lent to other departments and plants, as well as these machines and devices which are allocated for the fixed reserve aren't included production and are being included in manufacturing process only during the stop of appropriate machine.

One should emphasize that the manufacturing capacity isn't a category established once and for all the given enterprise, because is showing height in the long term with improving of methods the production, with improving structure of products, modernization or exchange of old machines to new [3].

Determining manufacturing abilities given enterprise and revealing is an aim of calculating the manufacturing capacity of available reserves and reasons for the underemployment of this ability.

Two groups factors influence the manufacturing capacity enterprise: internal and outside. They are basic internal factors determining manufacturing capacity:

- production factors (centers work, objects work the workforce) – installed machines and productive facilities, their kind, number and of characteristics technical and volume area of the work,
- selected structure output – selected schedule of production and applied raw materials, materials and technical fuel (shape, dimensions, physical and mechanical properties),
- industrial engineering – optimum technical standards reflecting the modern production technology, possible to get on had machines, optimum operating time of machines and devices and the production area in the sequence of year both the type production and the appropriate level labour organization.

## 2. Optimization production in the foundry

Assumptions optimization of production are aimed mainly at a maximization production result at determined production parameters. This action consists particularly in the so-called liquidation of production bottlenecks.

It is possible to characterize the method of optimization the production foundry as:

- conception optimization of planning,
- tool of shaping production operations,
- providing software for planning the manufacturing capacity,
- tool for the coordination of efforts in marketing, preparation and the completion of production for achieving benefit.

In this method on basis of sales forecast a network of stores was created, including data individual workstations. The computer system on basis of conducted tests is drawing up the schedule of powering, taking the unrestricted manufacturing capacity into account. The schedule is being used in classification purpose of stores for critical and noncritical, depending on the degree of using them. Critical reserves in this moment are treated as bottlenecks.

Drawing up the plan of course orders by bottlenecks system is a further step. At the end a plan of course orders is being drawn

up through noncritical stores in order not to infringe optimum critical stores [2].

He is helping to reach the implementation, applying and obeying system notable benefits in form:

- of shortening a production cycle,
- of simplifying the technique schedule production,
- improvements of cash flows and financial appreciable savings,
- productivity growth,
- reduction in the level production of supplies,
- enabling the simulation of solutions and their correction during completion production.

## 3. Shaping the chain of the supply

Chain the supply (supply or delivery) is tying processes of transport and storing into the system, having begun from the moment of acquiring casting materials through the production and distribution casts all the way to the ultimate customer. Analyzing processes in chain of supply one should keep an eye on marketing processes but also processes of supplying as the source improvement in economic outturns not only of foundry. The course these processes includes the sequence of action, thanks to which the material power supplies necessary for the production are being carried out. A big challenge for engineers dealing with these aspects constitutes determining optimum configuration this action.

Considering this problem chosen solutions which are essential for activity of companies on the market were presented. They belong to them:

- comprehensive process of supplying foundry,
- supply „slimmed down”,
- supply „elastic”,
- supply oriented to environment.

### Comprehensive process of supplying foundry

At present necessary a fact of comprehensive including processes of supplying foundry, including integration of domestic departments and integration with suppliers is revealed. In the foundry one should look at the material supply as for the process going beyond the area of action procurement department material. It is connected with activities undertaken in enterprise the field of preparing production, production planning, managing processes of pouring out and other processes [9].

Providing with the efficient course process of supplying is impossible without improving cooperating with suppliers. One should aspire from widening functional scope of cooperating and establishing partner cooperation. Shaping processes associated with the supply should correspond to logistic approach towards system. Here also connecting real processes, physical flow of materials with processes will matter greatly information – decision-making [4].

Such an approach towards the problem the organization of action foundry is facilitating achieving the so-called logistic excellence. Fig. 1 is showing individual guilds.



Fig.1. Features „excellence” logistic foundry [10]

### Supply „slimmed down”

A conception is gaining the more great significance of making look slimmer the production - (lean), particularly with reference to filed cooperative reports. Ideas „lean” it is possible to take back to the process directed for constant raising the effectiveness of processes carried out in the foundry through the elimination of waste and losses (including temporal losses). We understand by waste or loss any activity eating stores of foundry up, rather than creating the value.

Conception „lean” is based on the four organizational fundamental assumptions in area of production, that is:

- the top stair of exploiting manufacturing capacity,
- minimal supplies,
- short production cycle,
- add promptness.

In every process preparing and making the cast dense integration is significant with suppliers of moulding sand, scrap, elements alloy. It is special importance in case of big technological diversifying produced products. The high integration is being achieved thanks to the cooperation of company producing final products around relatively little number suppliers. Using many sources supply in relation to the distinguished group of materials at taking into account limiting supplies basic materials from all sorts suppliers can be an exit. Such proceedings can correlate with the proper quality selection of suppliers.

### Elastic supply

The elasticity action means the sense of direction for increasing the ability and the speed of reacting to floating signals from customers. It is possible here to apply conception improving the organization of processes enterprise consisting in planning processes at casting unit. We determine it with name reengineering

at it allows for organizing the cheaper, faster and more effective process in relation to primitive conceptions. The reorganization of existing processes in foundry allows to eliminate activities which values are bringing to none, and to use ones which are enlarging the value. Restyling of processes at unit allows to correct processes material supply essential systematically means, lets limit exaggerated costs organization of supplies and the use resources material and to improve the service quality.

### Supply oriented to environment

The growing awareness of social needs in the field improvement in natural environment and the quality of life is forcing foundries into taking activity aimed at limiting all inducers the height of pollutants and the adverse impact to man. Of action in favour of environmental protection in the enterprise are taken hold management system with the environment. They constitute the base of national system:

- ISO 14000 norm about worldwide reach,
- regulations European Union concerning the ecological audit,
- law on protection and for shaping the environment and statutory regulations of waste disposal,
- regulations the Ministry of Environment on domestic reach.

Regulations in field of ecology, referring to individual branches of industry, are tidied up according to individual factors (air, water, earth, waste) and they are in effect both in relation to a production process as well as very product. Realization so widened „of the bases for action of the enterprise within the scope of the environmental protection” requires the effective organization inside very enterprise. Drawing up balance of the ecological quantitative balance sheet is becoming important, as far as possible, of all effects provoked by product or working on environment and simplified version of ecological assessment. The growth in importance of cases associated with supplying enterprise caused, that supply had been recognized as the important component in the environmental protection which appears at the very beginning of chain of creating the value [9].

As environmental main causes informed process supplying as a rule such elements are being exchanged, as legal articles of enterprise, ecological awareness and costs.

The accomplishment of processes supplying foundry, taking environmental processes into account requires comprehensive treating. It includes environment-friendly action, having begun from choice of materials (sand, binder, chills, scrap), suppliers, methods implementation of transport, stock processes, until developing cast-iron scrap.

Immediately purchase visions environmental protection and one should consider the logistics of supply including, because one should relate ecological criteria to all action associated with supplying the enterprise [9].

The scheme of informed environmentally process supplying is showing fig. 2.

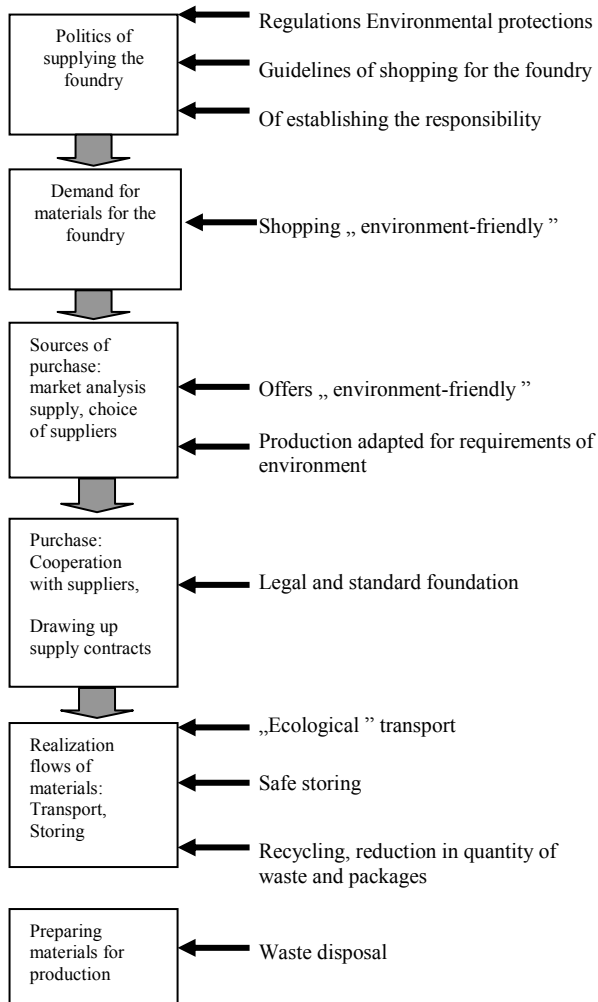


Fig. 2. Outline process of supplying the foundry orientated to environment [9]

## 4. Summary

The chain of supply is combining processes the transport and storing into the system, having begun from moment of acquiring casting materials through production and distribution of casts to ultimate customer. Analyzing processes in the chain of supply one should keep an eye on marketing processes but also processes of supplying as the source of improvement in economic outturns not only of foundry.

The course of these processes includes the sequence action, thanks to which the material power supplies necessary for production are being carried out.

Considering this problem chosen solutions were presented, essential for the market activity of enterprises.

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