

**POSSIBILITIES FOR IMPROVING THE COMPETITIVE POWER
OF THE INDUSTRIAL COMPANIES
IN THE BALKAN COUNTRIES THROUGH IMPLEMENTATION
OF DEMAND FLOW TECHNOLOGY**

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Abstract. *Demand Flow Technology /DTF/ is a modern method for industrial engineering assisting the industrial companies in the management of economic processes and improving their competitive power. This method used by leading Multinational Corporations (MNCs) and industrial companies with high degree of economic process intensity (business process), furthers the production of what the market requires at the moment, the reduction of unfinished production by improving the management of the material supplies and part-finished goods and the reduction of the expenditures for high quality maintenance of the manufactured goods. DTF is applied in a limited number of industrial companies in the Balkan countries.*

On one hand, the possibility for applying DTF under the conditions of the industrial companies in the Balkan countries is analyzed in the article and the enhancing their competitive power on the global market. On the other hand, the specific features of this application are studied and concrete recommendations are made, the implementation of which increase the effectiveness in the current conditions.

**1. PROBLEMS OF THE INDUSTRIAL COMPANIES COMPETITIVE POWER
IN THE BALKAN COUNTRIES**

Most of the industrial companies in the region face difficulties in the competitive power of their production in the global market conditions. The comparison between industrial manufacturing in 1985-1990 and nowadays indicates the big potential that some Balkan countries have. So for instance, Bulgaria had a good market share of some industrial products with big technological and constructive complexity (electro- and motor-cars). In different countries on the Balkan Peninsula the decreased competitive power of

the products is due to different factors of different nature (political, demographic, economic, etc.) and the result is comparatively low share of realized production on the global market. In Bulgaria, for example, started a transformation of the national market from centralized-planned economy to market-oriented one. This necessary change found unprepared many industrial companies which adapted with difficulty and still continue to adapt in the new conditions.

At the same time in the end of the 20th century the influence of the global market on the national producers increased to such an extent that they cannot be certain of their market share even in their own country. This world market globalization caused many after-effects that producers are supposed to take into consideration if they wish their factories to have successful strategy on the market. These results are connected to the raised competitive power of goods and services, which are offered to the consumers. It is accomplished not only on the basis of price but on the basis of other factors too, such as increased requirements for quality, conformity with the industrial requirements, aftersale service. The MNC adapted most successfully to the new conditions, that's why it is necessary to study their experience.

The tendency to conform to the individual requirements of the consumers leads to diversification of the produced goods. So processes that by then were only flow production by their character, should be modified without increasing the cost price of the production at the same time. Moreover these products should answer the increased requirements in connection with their quality characteristics.

To answer the requirements of the 21st century global market, modern methods for industrial engineering and management are developed, such as Concurrent Engineering /CE/, Business Process reengineering, Total quality management /TQM/, Virtual Enterprise /VE/ and so on. Demand Flow technology /DFT/ is a new method for industrial engineering, which creates preconditions for optimization of industrial companies production process on the basis of several indices: management of material supply and part-finished goods depending on the moment market demand, production delivery on the market in the necessary moment, production quality.

This method is new for the industrial companies of the Balkan countries, for its successful approbations need research, and as a result there should be pointed recommendations for more effective implementation of DTF in these conditions. Along these lines the experience of "Vidima" Ltd, industrial company part of MNC American standard, is studied.

2. IMPROVING THE COMPETITIVE POWER OF THE INDUSTRIAL COMPANIES THROUGH DFT

When analyzing DFT, the following major characteristics can be outlined:

1. The industrial engineering is implemented in space and time on the basis of a flow process and therefore has high requirements for coordination of separate operations by time and power. Narrow-fitting places are unallowable.
2. The supply zone is integrated in the manufacturing structure itself, which is the most significant factor for the optimal use of the production area.
3. The removal of the typical workshop structure. DFT is a system based on the concrete moment market need and is of drawing-out type. The production process is managed

on the basis of given real daily rates and is of short cycle duration. This leads to production in coordination by quantity, time and nomenclature with market needs. The consignment is ready directly before the moment of its expedition to the customer.

4. Flexible planning. A process map is developed, just as all possible technological routs of the processed semi-finished materials of the production nomenclature. It is of significant importance for the flexible process management according to the received orders from the market. The alternative technological routs for the materials flow passing are a binding condition on receiving high flexibility of the system. Thus for example, even the customer order is received with a stated intervals delay, for calculations of the resources of the industrial company production system are necessary and if it allows the extra materials from the suppliers to be drawn out, the order will be fulfilled due to re-examination and rearrangement of the produced consignment through alternative production routs by engaging extra human resources. The sums of by time the shortest, alternative technological routs for semi-finished materials production of one product from the production nomenclature are the minimum total time for its production.

5. Strong dependence on the suppliers. This is typical for every Just-in-Time process [1] and the supplier's production process is a continuation of the producer's DFT production process. From the delivery expedience quality depends if the producer using DFT method will be able to implement his/her production program in time.

6. Flexible delivery planning. The materials should be drawn out in time but in small quantities and more consignments. This ensures optimal management of the supply materials. The term "Supply turnover" is introduced. The bigger the supply turnover is, the smaller the materials and raw materials in store are, respectively the smaller the stores and the more frozen financial resources. The calculation of the consignments and the quantities when applying DFT is made up by two methods:

- On the basis of forecast for the necessary materials for the forthcoming three months and materials available at the moment.
- On the basis of the approximate value of the supply materials consignments in the last 12 months. The second method is more accurate.

7. The evaluation of the different operations quality of implementation is carried out in the operations themselves. It is not always possible but when it is applied it gives possibilities for control operations reduction. By this way the quality control becomes an internal element for the process.

8. The operations with low added value are assigned to external suppliers.

9. DFT method reaches high productivity of labor as much as possible through decrease of the intercycle and interoperational interruptions, which is a sign for a high quality of production organization.

By these basic characteristics of this new method for industrial engineering and management, one can maintain that it significantly increases the competitive power of the companies through getting near to the customer, producing the market demand in the necessary time limit and quantities, reducing the supply quantities. From there it goes to and the reduction of the necessary floating capital, reduction of control expenditure, lowering

the prime cost of reduction, etc. In the next section analysis of DFT application in the Balkan conditions is made.

3. ANALYSIS OF DFT IMPLEMENTATION RESULTS IN "VIDIMA" LTD

"Vidima" LTD is a company with traditions in production of sanitary accessories and bathroom equipment since 1934. During the years it is one of the companies with big market share in the countries of the Council for Mutual Economic Assistance /CMEA/. In consequence of the political world changes and the dissolution of CMEA, "Vidima" LTD losses its markets and reduces its production. As aspiration of the company to find new clients and recapture its former market share a privatization is done, then except of the majority share holder MNC "American Standard", shares of the company hold local physical and juridical persons.

In the whole American Standard network, "Vidima" LTD produces end-products under "Ideal Standard" trademark by using MNC channels for realizations as well as components necessary for carrying out the production processes of its partnerships. "Vidima" is in the strongest commitment with the following partnerships of "American Standard": "Ideal Standard"-Germany, "Ideal Standard"-Italy, "Ideal Standard"-France, "Ideal Standard"-Greece, "Ideal Standard"-UK, "Ideal Standard"-Mexico, "Ideal Standard"-Brazil. With these companies "Vidima" is in two-way connection – on one hand it produces components for their production processes and is a supplier for them, and on the other hand it gets components from them as an end-consumer.

The research of DFT application is made on the basis of its result analysis at "Vidima" LTD implementation for this company is to a great extent under the influence of the basis, characterizing this new industrial engineering method occurrence. On the other hand this company is one with long-lasting traditions working in the Balkan conditions. The major reasons for DFT implementation in "Vidima" LTD are:

1. Production program (by nomenclature and capacity) defined according to the global market needs and satisfied through "Ideal Standard " trademark. This pre-determines a high dynamics when defining the nomenclature and the capacity of the produced goods.
2. Strong commitment with suppliers and companies, clients of its production. The delay of terms is impossible in the global market conditions. This cooperation, of worldwide importance, leads to more effective use of the production capacities of the "American Standard" partnerships. The result is synergic effect when using the production capacities of the MNC partnerships.
3. Production with reduced prime cost due to reduction of the unfinished products when working with minimum supply availability. As it was previously said this is one of the basic pillars of DFT method.
4. Production, interior to the high requirements for production quality as reducing the operations not generating added value.

The changes due to DFT implementation will be analyzed separately.

Changes in the production capacity. After the privatization of the industrial company the production capacity has significantly increased. In the old workshops as a result of modernization of some machines and equipment and DFT implementation the production capacity is increased by 25 % from 2,7 million to 3 million sanitary accessories per year. It is compulsory to point out that the old production process was built on the flow line principle with high coordination between the separate production operations. So this increase by 25% is an achievement deserving attention. The additionally formed, after the changes, production sections have the possibility to produce extra 2 million sanitary accessories per year. Thus the total production capacity of "Vidima" LTD increased 2.1 times. How does influence the use of the production areas? In the conventional methods of industrial engineering with section structure and supply economy the same increase of the production capacity would be made, in the best case, at 60% increase of the production areas. In the case of DFT "Vidima" implementation, the industrial company because of the reduced supply economy and the removal of the redundant operations has reached the increase of the production capacity by 2.1 at increase of the production areas only by 12% or 5 times less.

To a high extent the decrease of the necessary areas is due to the integration in the production structure of the specific for the DFT supplying zone "RIP". The flow of the technological process is shown on figure 1.

Flexibility of the production process. Through development of the process maps high flexibility of the production of product included in the nomenclature is put into practice. This is valid for all productions as for example can be given partial process on casting of the bodies of sanitary accessories, which can be done in 12 different alternative routs.

Supply turnover. Since 1999 when DFT was implemented for the first time in "Vidima" production subsystem, the supply turnover number increased from 8.9 to 17 in the end of the year and in the end of 2002 it was 25. According to this the liquidity of the company increases significantly – the frozen financial sources are decreased.

Quality control. Areas for control on the material flow half-finished products are differentiated on different stages of the process. This control is done by the employees themselves not by a specialized control body. That's how, except the rest positive consequences, more effective working time use is achieved. In consequence of the passing of external quality check-up, done only by specialized sections in the industrial company, to the typical for the DFT full internal quality control, the expenses for ensuring the quality decrease from 2.5% in the beginning of the method implementation through 1.4% in 2001, to 0.6% currently.

Customer delivery period deviation. In the basis of the DFT method is manufacturing of such production capacity and nomenclature that the customer ordered for the desired date for expedition. Therefore the major success or failure indicator of DFT in the given company is the deviation (positive or negative) on this date. "Vidima" LTD reached significant positive results by this indicator. For the period April 2002 – March 2003 the expedition in time for the assembly lines, given as percent of the general orders, was in the limits shown on figure 2.

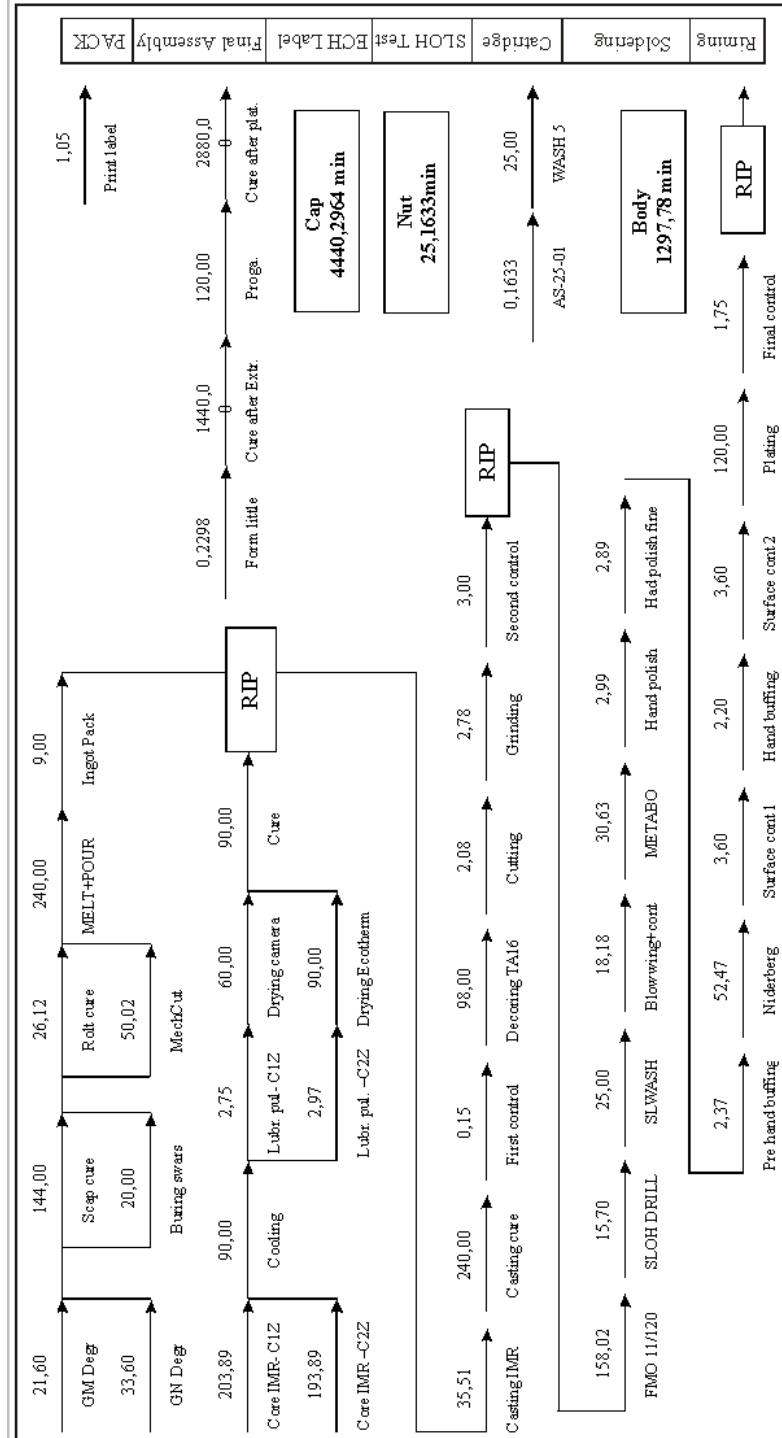


Fig. 1. Flow of the technological process

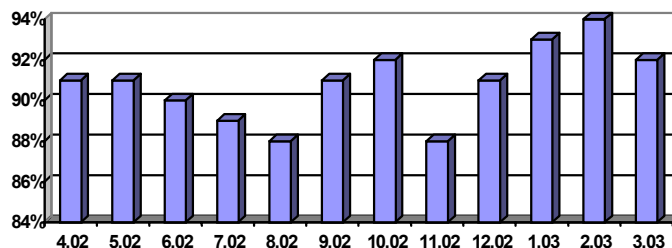


Fig. 2. Customer delivery period deviation April 2002 – March 2003

For the whole company we can make a comparison between 2001 and the planned performance in time of the orders in 2003. It promises to become an increase of 12 points (from 82% to 94%).

Still it is too far from the DFT capacity. When comparing "Vidima" LTD and the other branches of "American Standard" [2] where expedition deadlines are fulfilled nearly 100% we can conclude that there are many unused possibilities.

The analysis of the reasons leading to delivery delay shows that they are due to problems with the suppliers. Formally the suppliers can be divided into two groups – these who implemented Jus-in-Time methods and others who are conventional producers. Unfortunately most of the producers on the Balkans are of the second type. This is a specific feature of the industrial production of the Balkan countries strongly influencing DFT producers.

To implement DFT, "Vidima" LTD changes constantly the ration between suppliers with Just-in-Time systems and such who did not implement it (figure 3) Usually the tendency is to deliver half-finished materials from the partnerships of "American Standard", because of lack of enough local producers implemented Just-in-Time technologies.

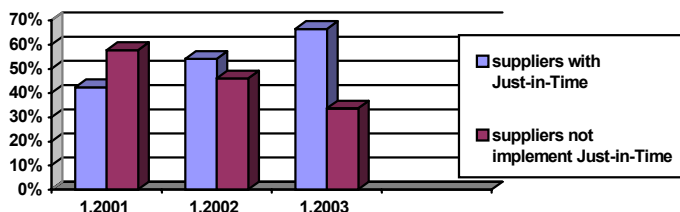


Fig. 3. Just-in-Time suppliers

Productivity of labor. The flexibility of DFT technology leads to changes in the employee organization and in their productivity evaluation. The employees are united in teams, and the evaluation of their work depends on the precise without deviation (in positive or negative direction) of their daily quota. From the point of the team organization as an indicator for the productivity of labor we can define the average daily productivity of one employee. Since the implementation of DFT the average daily productivity of an employee increases constantly (fig. 4). The increase in comparison to the first year of DFT application is 285%. It is necessary to point out that this increase is not due to the structural change of the production personnel, which has kept relatively the same.

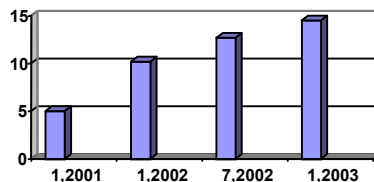


Fig. 4. Average daily productivity of an employee

CONCLUSIONS

As a result of DFT method implementation in the conditions of typical Balkan business situation, such production structure of the industrial company and such production organization is formed that the usage of production areas is improving, internal and inter-cycle interruptions decrease, the productivity of labor increases, the unfinished production decreases, too and the liquidity is improving. The expenses for supporting high quality are decreasing, the flexibility of the production process is increasing and at last but not least the deviation from the terms of customer delivery is decreasing drastically. The latter is directly depending not only on the DFT implementation but also on the selection of such suppliers who answer most fully to the requirements for Just-in-Time delivery. This is a problem in the conditions of the Balkan business conjuncture.

As a result of DFT implementation it is possible to improve considerably the competitive power of the industrial companies on the Balkans in the global business system conditions.

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MOGUĆNOSTI UNAPREDJENJA KONKURENTSKE SNAGE INDUSTRIJSKIH KOMPANIJA BALKANSKIH ZEMALJA PRIMENOM TEHNOLOGIJA TOKOVA TRAZNJE

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DFT (Demand Flow Technology) je moderna metoda industrijskog inženjeringa koja pomaže proizvodnim kompanijama da efikasnije upravljaju ekonomskim procesima i da unapređuju svoju konkurentnost kako na nacionalnom tako i na globalnom tržištu. Implementacijom DFT metode u balkanskom poslovnom okruženju industrijske kompanije mogu razviti proizvodnu strukturu koja će im omogućiti: poboljšanje proizvodnje, smanjenje internih i intercikličkih prekida, povećanje produktivnosti rada, minimiziranje nedovršene proizvodnje i poboljšanje likvidnosti. Takođe, primena DFT metode podstiče smanjenje troškova unapredjenja kvaliteta, povećava fleksibilnost procesa proizvodnje i omogućava isporuku porudžbina potrošačima u vreme kada oni to žele. Međutim, sve ovo ne zavisi samo od implementacije DFT metode već i od raspoloživosti i selekcije dobavljača koji mogu efikasno da odgovore na zahteve potrošača za JIT isporukama. Upravo je to jedan od važnih problema u poslovnoj konjunkturi balkanskih zemalja.