

# REENGINEERING OF PROCUREMENT PROCESS IN THE HIP-PETROCHEMISTRY j.s.c. Pančevo

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**Abstract**—The aim of this study is a presentation of a simplified procurement process and delivery of goods both in the central and operating warehouses of the „HIP Petrochemistry“ j.s.c. The intention of the creative (re-design) design of the procurement process is to improve the competitive position of the organization, its value both to shareholders and contribution to society.

**Keywords**—procurement, reengineering, logistics.

## I. INTRODUCTION

THE The most important business goals in today's global economy are speed, quality, flexibility, productivity and low price. While creating the study we relied on the basic tasks of logistics and reengineering principles. The reengineering itself presents a radical redesign of business processes due to their dramatic improvement. Under the dramatic improvement is considered a leap in performances that implies manifold increase in the productivity or drastic reduction of the duration of length of a certain process. We believe that the key role in the forthcoming process to improve the work in the warehouse department belongs to the management. We also believe that the process of improvements are not achievable without expanding the powers of a number of people to be able to freely operate and make decisions for which they are qualified and up to now they were to be denied.

## II. PRESENTATION OF CURRENT SITUATION

On the basis of working meetings, interviews of employees and record of whole spare parts procurement process, the following problems were noted:

- Unnecessarily employed a large number of people administering in warehouses.
- The second problem concerns to authorization. In fact, they are at extremely low level and it contributes greatly to complications during a procurement of a simple claim of spare parts.

- The third problem is related to lack of knowledge and use of computers.
- Also, a major problem is related to extremely poor coordination among the operating warehouses and between the main (central) and operating warehouses. This primarily refers to the fact that there is never an accurate view of what any warehouse owns of spare parts and raw materials. Due to all of this, it used to occur that some certain parts were needlessly piled up, and that some very important parts were purchased at the last minute thinking that some certain quantities still were in some of the warehouses of this factory. Simply, according to our point of view, a problem occurred because the input and output of the goods were not memorized in the computer programs and that the records were kept on the so-called "Input/output cards" which at any case are outdated, especially if it is concerned to a „Petrochemical" giant.

Figure 1. presents relationship of receipt and requisition of fixed assets, where we can see a large gap that leads to a lack of fixed assets at the moment, while on the other hand, we have accumulation of marginal fix assets which causes loss, because certain capital is captivated in assets that will not be used for years.

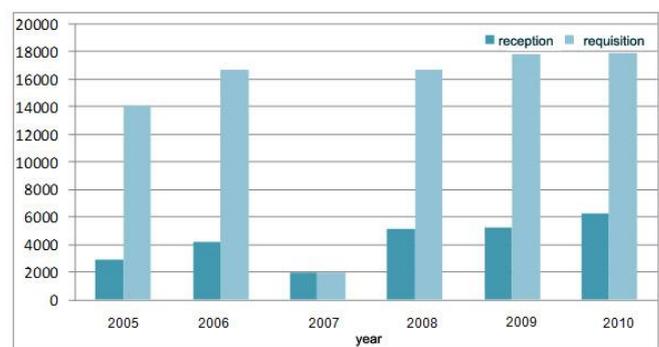


Fig. 1. The ratio of receipt and requisition of fixed assets

As in the previous figure, and in Figure 2. we note pile-up, in this case of equipment and spare parts that will

inevitably lead to poor business performance and hence to a loss for the company.

The survey and record of position in which are located either the Central warehouse, or the operating warehouses within the framework of HIP-Petrochemistry, we've come to the conclusion that in its operation appears a number of irregularities which greatly hinder the smooth running and hence increase the non-negligible costs. Also, we have concluded that it is necessary as soon as to bring the warehouse to its purpose for storage of spare parts, equipment and chemicals.

From the graphical display of the organizational structure of warehouse sector in HIP „Petrochemical j.s.c.“ (Figure 3.) and display of spare part supply shown in (Figure 4.), we can see that this process is consisted of 22 activities, for whose carrying out sometimes is necessary the whole day, also in the process is included 22 executors.

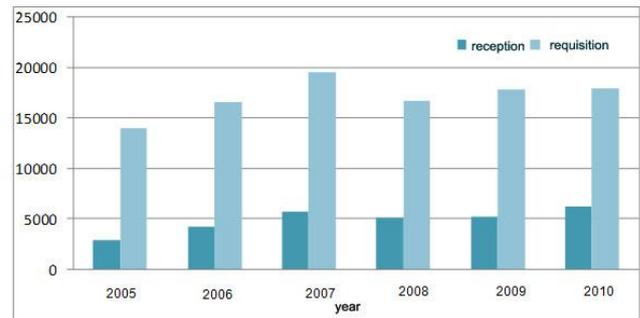


Fig. 2. The ratio of receipt and requisition of equipment and spare parts

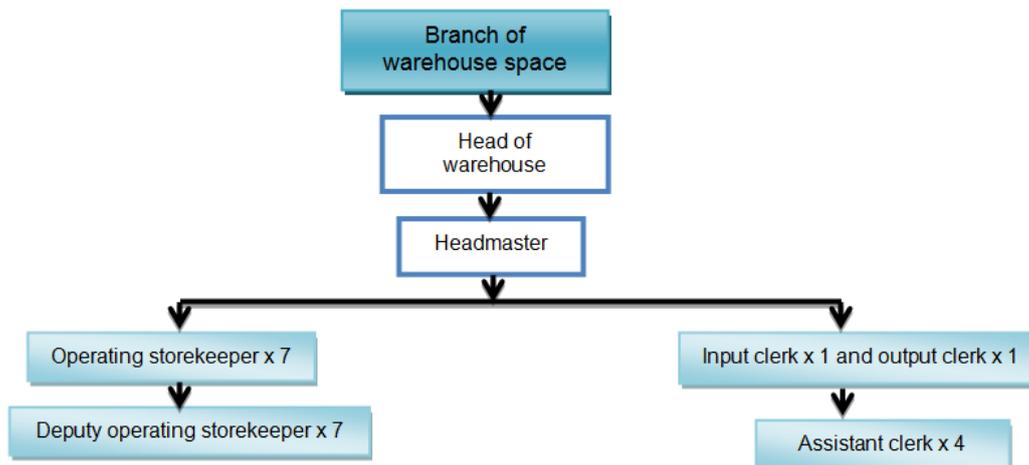


Fig. 3. The organizational structure of the department warehouse in HIP „Petrochemical j.s.c.“

### III. PROCEDURE FOR ACHIEVEMENT OF GOALS

De Leeuw says that the complexity of order process is of multi-dimensional concept that concerns to interdependence, uncertainty, possibility to control and heterogeneity. We will consider each of these dimensions through the prism of the order process. By the same author, order process can be viewed as a system [7]:

1. The first dimension is the complexity of interdependence. De Leeuw says that the system is complex when there is a high degree of interdependence among the separate elements of the system. When a complex system decomposes into several sub-systems, that decomposition creates a need for coordination among the elements in which the interaction is interrupted.

2. Another dimension of complexity is uncertainty. Complexity of the order process can be described by the degree of uncertainty that is reflected in the process. When demand and production are on high degree of unpredictability, process order will generally be faced with a lot of uncertainty. In the order process, we often see that it is possible to estimate demand at the aggregation level, but it is impossible to accurately predict demand in details.

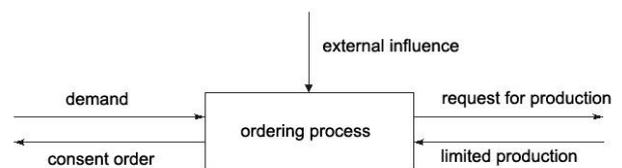


Fig. 5. The order process [7]

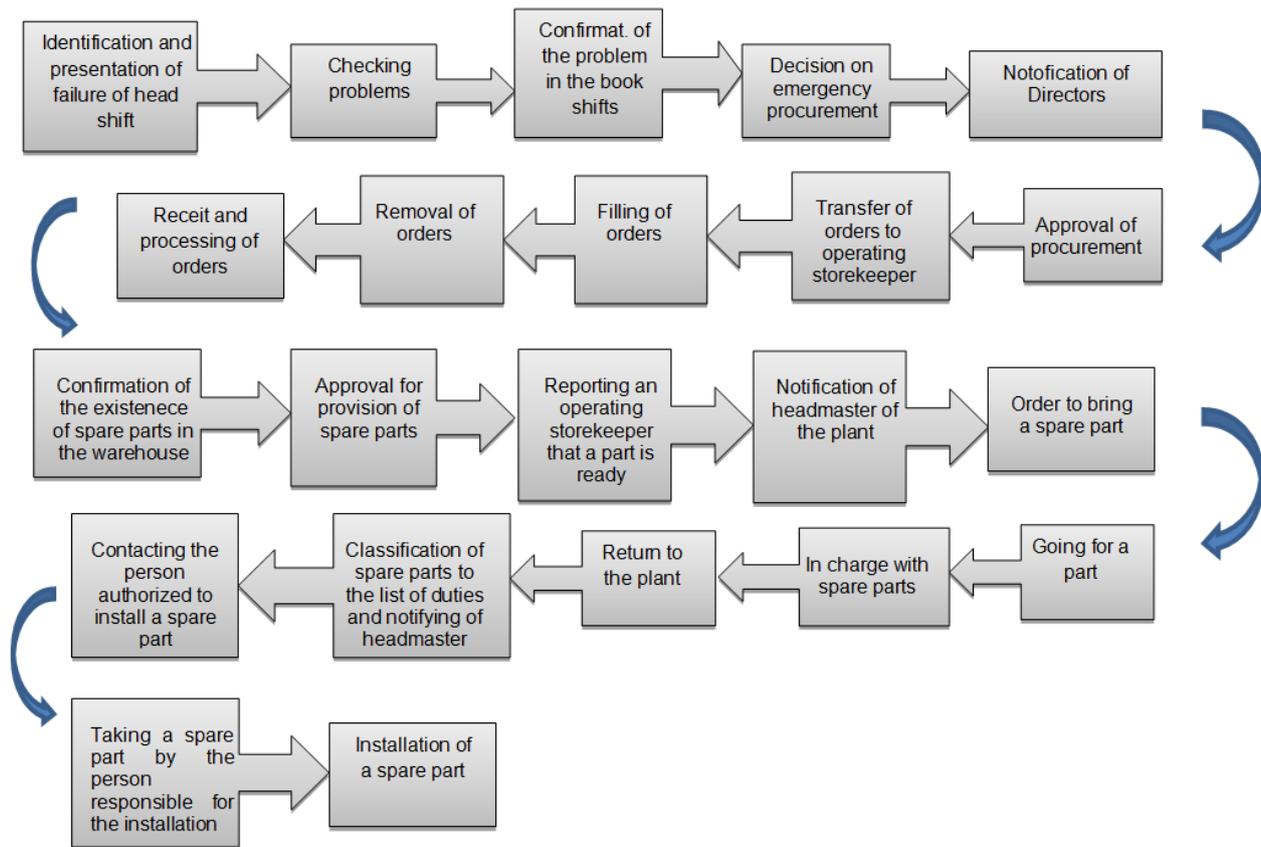


Fig. 4. Graphical display of spare part supply

The third important dimension of complexity is the ability to control the process. In the order process it is necessary to handle with a large amount of information in order to match the demand and supply of products. On the one hand, we need to process information related to demand of the user, and on the other hand, there is a need for information about the limitations of the production system.

From the aforementioned can be concluded that order process can be extremely complex due to the participation of various parties who are often highly interdependent, but at the same time have different goals and conflicting interests. Furthermore, unpredictability and heterogeneity of demand strongly affect to complexity of order process. Many organizations are faced with the question of how to structure the order process in a way to cope with the complexity of the process.

The goals of the new process in our case would be:

- Reduction of the large number of activities using information technology
- Simplification of the procurement process and significant shortening of the procurement time
- Reduction of the employees' number in the processed sector
- Training of required number of employees in the warehouse sector for the use of computer technology
- Prevent pile-up of certain parts, or lack of the same

- Reduction of reserves of spare parts and equipment
- Reduction of maintenance costs
- Relocation of spare parts and equipment from »petty« magazine located in manufacturing plants
- Identification and uniform labeling of all spare parts
- Establishment of an information system that would allow maintenance engineers in manufacturing plants the fast access to spare parts inventory.

### 3.1. The criteria for achievement of goals

Improvement of any segment include large and numerous changes in the company. Primarily, they can have an economic, technological or social character. Implementation of new ideas must be consistent with the educational and technological capabilities of the organizations and leadership ability.

The main criteria of success are:

- support to logistics information system automating the procurement process
- qualitative shift in processing information
- reduction of errors
- shortening the duration time of the process
- time savings of services
- lower investment

In order to improve the procurement process of spare parts in the company is necessary to improve the existing information system and train employees to implement new applications. Introducing new software

that would coordinate among all plants, as well as among the plants and central warehouse, which in this case would become unique, there would stop the need for existence of operating warehouses. The modern

information system would signalize if certain number of parts and raw materials fall to the prescribed minimum, enabling a required spare part to be purchased in time which would prevent the processes to be stalled.

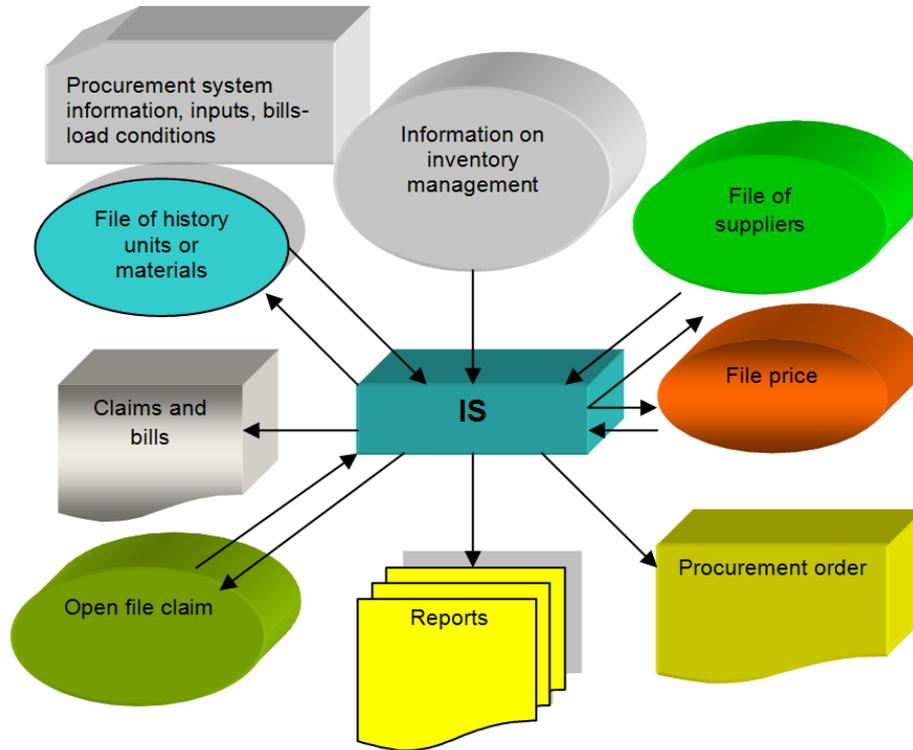


Fig. 6. Automated information procurement system [6]

With the introduction of shift work we would get twenty-four working hours. This would overcome the inability requisition of materials when the stores are closed, and thus prevent to wait at fault repairs. The next step you should do is to give power to the head-shift who, after the determination of the fault and getting knowledge which part should be replaced or ordered, he can independently without authorization from the higher instances order that part. Ordering should be carried out via computer intra-net network, which means that each operating computer should be networked to a computer in a main warehouse.

Implementation of the radical systematization in the warehouse sector would concern to the number of employees. With the existing 22 employees this sector would be reduced to 12.

#### IV. DESCRIPTION OF A NEW PROCESS

In accordance with the criteria for achievement of goals we present a proposal of a new process:

1. External operator by visual observation of the problem or failure informs a head-shift.
2. Head-shift gets out to verify the occurred problem and makes his conclusion.
3. As the powers allow him now, he without prior consultation and approval by the side of the others

claims a part directly via the computer network thanks to intra-net which is connected to the warehouse service.

4. The store-keeper upon receipt of messages, checks numerically the part at the stock, and after finding it he registers and lets it get out.
5. An assistant store-keeper takes over a part and takes it to the plant in which it is necessary the same to be installed.
6. The head-shift takes over a part from an assistant store-keeper, signs a receipt and registers in the purchase book.
7. Then a head-shift contacts a person in charge for installation.
8. The next step is taking over the requisited part from the person responsible for installation (locksmith, electrician, instrumentalist).
9. Installation of the requisited part by the already aforementioned person who is responsible for the installation of the same.

After the implemented changes, the organizational chart (Figure 7.) and network activities of a new process (Figure 8.) in the warehouse would be seen as follows:

V. EVALUATION OF RESULTS

In the era of modern business doing the customers' demands are growing both in goods and services, and the company must work more and more on perfection and adaptation of its offers because a customer's satisfaction is a condition for the survival of the company.

The greatest expected effect of the new process is to increase the value to the ultimate user, which is reflected in the simplified process and shorten the total duration of the process. Another important feature of the new process is that the new process means, thanks to authorities and bypassing unnecessary people, come to the more effective performance.

The biggest shift is reflected in the fact that the service of the warehouse employed twenty-three people while after the implementation of the new processes service employed only 12 people.

After the implementation of new processes, the sector of the warehouse would be managed by one manager, who a part of authorization would transfer to a headmaster.

For all three shifts would be employed a single store-keeper including his assistant, the same would be applied to the reserve shift, as well as to the shift that would be free.

Manager or headmaster would take care of all the entrances implementing them in the information system of the warehouse, while the store-keepers are obliged to inform about procurement needs of any part as an alarm signal is detected in a small number of parts in stock.



Fig. 7. New organizational structures in warehouse sector.

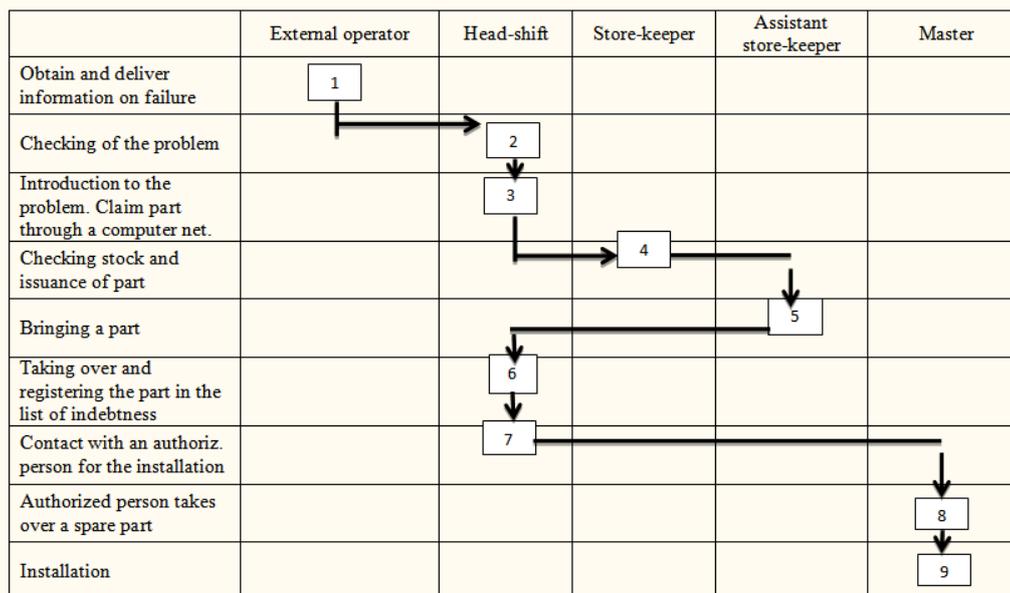


Fig. 8. Network activities of a new process

Another responsibility of the store-keepers are related to the monitoring of potential claims by operating head-shifts, either they're referring to a certain part, raw materials or any other claims that are in their jurisdiction.

The assistant store-keepers would have responsibility that after the issuance of the goods by store-keepers, the same to transfer to the final destination-plant or any other sector. For this purpose, the company should provide a car that the waiting time to be reduced to the minimum.

Table 1. Number of employees in the warehouse sector

	Employees in the warehouse sector
Existing situation	22
Proposed solution	12

Table 1. shows the number of employees in the warehouse before and after the reengineering process of the spare parts supply. Decision-making becomes integral part of the process. Unnecessary control procedures are abolished. Employees, according to instructions of executors become independent and creative professionals who are focused on solution of problems rather than managers. Provision of

authorization to employees is based on the competencies that from the good experts not to create bad managers.

Training and empowerment of the participants in the process certainly increase the motivation of the same, as decision-making becomes a part of the process, which eliminates control procedures, and all of the simplification and cost reduction process. In terms of contemporary business doing, value of the company is no longer measured by the value of its inventory or fixed assets for work, but the knowledge, competence and motivation of its employees.

As for the staff, proposal is to hold meeting with all of the so far workers employed in the sector of the warehouse service, and thus to note the climate swings for permanent abandonment of the workplace.

As we've already mentioned, in places of a store-keeper or an assistant store-keeper work people who have acquired disability in the factory and the next step would be:

The offer of payment of the annual gross salary, including the fact that on the decision of the termination of employment contract is written they're redundant and this means that under the current labor law in that case they are entitled to one-half of the award-deserved retirement until they acquire one of the retirement condition and where would be calculated the overall payment of the same.

We believe that the conditions for leaving the company are attractive and that we will easily find the interested among the employees who in this way would meet the rights to consensual termination of labor relations.

In case that there appear an insufficient number from the warehouse pro forma these people would be assigned to positions of those disabled who are willing to compromise.

The costs of severance payments of employees would amount to 10 (number of employees) x average salary in the current year x 12 (number of months). Expressed in figures is  $10 \times 42000 \times 12 = 5.040,000,00$  din. or per man 504.000,00 din.

This does not include the costs of training for all participants in the new process for use of computers and computer networks for the entire training was provided in cooperation with the department of cybernetics of the „HIP AZOTARA“.

This money will be paid out after the first year of operation in the new system.

The funds which were needed to pay for employees in the warehouse sector would be drastically reduced.

Table 2. Required time for the spare part supply

Time	Minimum duration time of the process	Maximum duration time of the process
Existing situation	2h 30 min.	18h 30 min.

Proposal for new decisions	30 min.	40 min
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Table 2. shows the minimum and maximum of spare parts supply before and after the introduction of changes that have been implemented in the warehouse sector, which operates within the service of Logistics in HIP Petrochemical j.s.c.

Table 3. Number of executors and activities

	Activities
Existing situation	22
Proposal for new decisions	9

Table 3. shows the number of specific activities before and after the completion of reengineering process. We can see that the number of activities are significantly reduced in the process of spare part procurement.

## VI. CONCLUSION

Starting from the noticed problems, in the observed process: there is the routine relationship towards the work, the process abounds with numerous activities, it is very cumbersome both to store-keepers and orderers, it takes a long time and therefore has a large number of employees, simplifying the process through shortening the duration time and reducing the number of employees as well as empowerment and training of employees; the following values have been achieved:

1. The biggest effect of the new solution is to increase the value for a part of buyer/orderer reducing the number of executors. After the implementation of the new process the working hours will be extended in three shifts, and thus is achieved an absolute availability of all parts at any time. Reducing the process costs creates the preconditions for allocation of money to the development sector which will contribute the company to be still profitable and to successfully run the race with competition.
2. Trainig and empowerment of employees increases the motivation of the same, for decision-making becomes a part of the process, which will also lead to the elimination of unnecessary control procedures, and all of the simplification and cost reduction process. In the future, the company's value will not be measured by the value of its inventory, but the knowledge, competence and motivation of its employees.
3. Proposal solution which is presented in this study, would be just one stage in the comprehensive process of implementation of the Integrated Management System. Achievement of high level quality becomes increasingly important. For entry to the global market is no longer enough just quality, but also an internationally recognized proof of quality in the form of certificate ISO 9001:2008. The quality management system is the only standard that can be

used for the certification of the management in the business world. It is essential that the company predict environmental changes, no matter how it's complex and difficult and timely to adapt its business to the environment.

With some investment, introduction of contemporary technologies provides the company a competitive advantage in the market competition, relieves services of companies, giving them more time to deal with their primary tasks, and some processes are fully automated. Vital information for business enterprises are becoming available in real time, and the information system also presents the system to support decision-making or a kind of advisor in business reducing risk in decision-making. In the study is designed a new procurement process of the spare parts in the warehouse sector in "HIP Petrochemical" j.s.c. This apparently seems a bit, but if other sectors are joining to this trend of development, we freely can say that the success of the company in the market is guaranteed.

Although the change in work of storage sector will have an impact on other business spheres of companies, but to reorganize just a part of the process and the service is little in order to create conditions for further and more significant changes. The change itself, in order to provide successful results, has to become a process which its ideas from realization and implementation, should be monitored and checked by pre-defined measurable criteria.

Most of the petrochemical companies that present our competition, both direct and indirect, in addition to investing in new technologies and manufacturing facilities long time ago carried out reduction of maintenance costs unnecessarily burdening them. From less objective and more subjective reasons, rationalization of maintenance in HIP-Petrochemical j.s.c. is a process yet to come.

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