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## **Relocation of a production unit**

### **Abstract**

The need for relocation of a factory occurs naturally in the life cycle of every growing manufacturer. It is a difficult and complex process. Its implementation requires a lot of expertise and accuracy in planning. The aim of this article is to present a sequence of operations which constitutes a sample relocation operation as well as to enlist the success factors of such an operation in order to familiarize this important issue.

### **Keywords**

production relocation, production unit, relocation success factors

## **Przeniesienie zakładu produkcyjnego**

### **Streszczenie**

Potrzeba przeniesienia zakładu produkcyjnego pojawia się w naturalny sposób podczas cyklu życia każdego rozwijającego się przedsiębiorstwa produkcyjnego. Jest to przedsięwzięcie z rodzaju skomplikowanych i trudnych, którego przeprowadzenie wymaga wiedzy i umiejętności trafnego planowania. Celem artykułu jest zaprezentowanie kolejności operacji w procesie relokacji a także wskazanie czynników sukcesu takiego przedsięwzięcia, w celu poszerzenia ogólnej wiedzy o tym zagadnieniu.

### **Słowa kluczowe**

przeniesienie produkcji, zakład produkcyjny, czynniki sukcesu relokacji

## **Introduction**

The need for relocation of a factory occurs naturally in the life cycle of every growing manufacturer. It is a difficult and complex process. Its implementation requires a lot of expertise and accuracy in planning. Fortunately, managers and project engineers who are in charge of such operation can location can profit from the experiences and knowledge drawn from previous relocations. The aim of this article is to present a sequence of operations which constitutes a sample relocation operation in order to familiarize this important issue.

## Reasons for relocation

Every growing company which manufactures goods sooner or later has to face the need for relocation. There are numerous reasons standing behind such action. First of all, if the premises occupied by the company become too small to expand production, especially if it is not possible to enlarge the factory. Secondly, companies are often forced to relocate because their facilities are located in the area where new roads or other public objects are going to be constructed. What is more, companies often relocate to concentrate their distributed production in one place. There are also economical reasons for relocation. If the manufacturer has its premises in the heart of the city it is profitable to move production and sell the land for a high price. Finally, companies relocate to gain access to necessary resources. According to J. Dunning<sup>1</sup> in his eclectic paradigm one of key factors in the internalization process is localization. A company is able to strengthen its competitive advantage by means of locating its premises close to the sources of raw materials, affordable workforce or other necessary resources. Taking into account how dynamically the world economy is transforming nowadays it becomes inevitable for corporations to relocate their business units in order to be close to what is necessary now and today.

An ideal relocation process ought to follow the concept *safety first*. If this basic requirement is fulfilled the investor has to decide if money or time is a more important factor. The attempt to minimize in parallel the period of relocation and its costs is likely to be a failure and the investor will never be fully satisfied. A much better strategy is to set the deadline and minimize costs or, if a factor of time is less important for a company, set the budget and try not to exceed it. Every organizational change means turbulence and a temporary fall of effectiveness. That is why majority of companies try to shorten the period of reorganization. However, there are some types of plants, such as sugar factories, which operate only a certain time in a year and throughout the rest of the time remain inactive. In such cases the cost of relocation is crucial as there is no need to hurry due to the inactivity period. Finally, the objective is also to limit negative influence of the relocation on the environment and local community in accord with the concept of sustainable development.

## Stages of relocating a factory

The relocation of a factory is a process which can be divided into a few stages. The whole project is initiated when the idea is first mentioned and becomes considered by top managers. Sometimes companies are forced to relocate. In such cases top managers do not need to consider if to relocate or not but when and where. The final decision is preceded by strategic analysis of possible locations in which the best place for the premises ought to be selected.

Relocation of a production unit is always a complex venture. That is why in order to execute it appropriately it is necessary to divide it into separate stages.

<sup>1</sup> J. Dunning, *International Production and Multinational Enterprise*, Allen and Unwin, London 1981.

A German company MES<sup>2</sup> which specializes in such tasks have created a very useful methodology which can be applied to most relocation projects. It includes the following stages of relocation:

- Planning
- Preparations for disassembly
- Disassembly
- Cleaning / Disposal
- Packaging
- Transport
- Preparations for installation
- Intermediate storage
- Installation
- Final cleaning
- Start-up
- Start of production.

The strategic decision of relocating a factory should be preceded by different strategic analysis such as SWOT or PEST. Even if a company operates in a hypercompetitive environment full of turbulence, uncertainty and hostility and is forced to make rapid strategic moves, they ought to be deeply analyzed<sup>3</sup>.

The first step in planning concerns collection of all necessary permits. This process can be very time-consuming as bureaucratic procedures in some countries can last months. For example, according to the report Doing Business<sup>4</sup> it takes more than 160 days to obtain a construction permit. Planning also includes designing the infrastructure with all installations as well as auxiliary systems, such as air-conditioning etc. It is also necessary to plan the production process at new premises. In order to do this, the flow of material and layout of machinery must be considered. Finally it is crucial to schedule the relocation period activities as well as technical inspections and personnel training.

After having accomplished the planning stage usually comes time for preparations of disassembly. If the project seems risky it is advisable not to forget about insurance policies. Selection of disassembly teams and tools for them is another crucial element of this stage. If the relocation is executed by outsourced partner it is necessary to provide ERWI (Equipment Relocation Work Instructions) which should contain precise information about disconnecting, disassembly, cleaning, loading, assembling, connecting and starting in a new place. ERWI should include the list of equipment with the serial numbers and graphic illustrations. Finally it should include the condition in which the new premises should be left in by the contractor after the relocation process<sup>5</sup>.

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<sup>2</sup> *Production Relocation — Comprehensive Technical and Logistics Solutions Worldwide*, [www.mes-engineering.com](http://www.mes-engineering.com).

<sup>3</sup> R. D'Aveni, *Hypercompetition: Managing the Dynamics of Strategic Maneuvering*, Free Press, New York 1994.

<sup>4</sup> *Country tables*, [www.doingbusiness.org](http://www.doingbusiness.org).

<sup>5</sup> M. Piłat, *Przepis na sukces przy przenoszeniu zakładu*, „Inżynieria & Utrzymanie Ruchu”, [www.utrzymanieruchu.pl](http://www.utrzymanieruchu.pl).

The choice of transportation company is another crucial stage. The selected contractor has to be reliable, have appropriate means of transport, containers and permits. If the process of transportation requires intermediate storage it is necessary to arrange intermediate storage facilities. Finally, packaging materials must be prepared. In order to fulfill environmental protection requirements disposal channels of different sorts of waste have to be arranged. According to the specialists from the company MES which specializes in constructing and relocating factories:

*The quality of disassembly preparations decisively influences schedule effectiveness, occupational, fire and environmental safety and protection and represents the basis for controllability of the overall risk for the supplier and the customer.*

If we look at the process of relocation from a broader perspective it becomes clear that proper disassembly preparations are crucial for the overall success of the project and must not be neglected. The mistakes made on this stage will surely complicate the operation or may even suspend the execution of the venture. One of the mistakes which is likely to be made is to relocate machinery which will be unnecessary in a new place or which is simply broken down.

The operation of disassembly ought to start with a proper labeling of system components so that they could be easily identified during reassembly. The moment before the machines are disassembled is perfect for comparison of foundation dimensions with dimension plans in order to identify the differences. Next stage involves cutting out the supplies such as power, water etc. All the things remaining in pipes ought to be drained. Later on electrical cables should be disconnected along with all electronic equipment. The next step is to disassembly of measurement technology such as thermal test equipment. All the controller programs ought to be backed up in case of data loss. Finally it is time for disassembly of mechanical components which ought to be executed along with cleaning process and the optical control in order to spot possible damages which couldn't have been visible before. After having accomplished that final part the area of disassembly should be cleaned and the unnecessary remains ought to be disposed of. Even though the operation of disassembly may seem the easiest part of the project it is crucial to remember that the mistakes made at this stage, for example improper labeling of components, may heavily affect next stages of the whole relocation process.

Providing appropriate packaging for the components means the selection between containers, crates, pallets or foil. The choice is determined not only by what we pack but also the means of transport and the distance. The more the components are exposed to damage the better packed should they be. The knowledge and experience of the transport company can be beneficial at this stage.

The machinery which arrives at a new place cannot be assembled straightaway. First of all foundations have to be prepared and well measured to check if they fit the equipment. Secondly it is crucial to provide all necessary elements for the operation such as power, cranes, tolls, different containers, communication equipment as well as find and contact local suppliers of necessary things and if the project is executed overseas, interpreters. If the relocation process requires intermediate storage, such a facility ought to be constructed. Assuming that at this stage we possess all permits

it is time to prepare the supplies of the system such as water, air, power etc. It is also the time when the disposal of waste ought to be organized. If the relocated system is to be adapted to new conditions, the changes can be introduced just then. They may include preparation of new pipelines, cabling or even larger steel constructions.

If all the procedures mentioned above have been completed, the installation process can begin. Its first phase is usually structural steel installation. This process involves using heavy equipment and requires perfect coordination of work as though that kind of installation is executed in a sequence which usually cannot be changed. After that an electric control cabinet is prepared. This control panel becomes the electric heart of the site. Only after that all the components of the relocated factory can be fitted on its places and the pipelines as well as measurement instruments can be installed. The components ought to be carefully examined against any possible damages which could have occurred during the transportation so as not to install broken machinery. Finally, all the electric cables can be put and connected to the cabinet. Since then all other systems can be connected (water, air, exhaust ect.). Before filling them it is necessary to adjust and level all components.

The start-up of a factory may seem to be a simple procedure but in fact it consists of at least a few phases. First of all it is necessary to check if all safety equipment is on its place. Next every unit ought to be inspected and functional tests should be executed. It is important not to forget about things such as proper direction of rotation. Finally, pneumatic and hydraulic equipment can be set and/or adjusted and indicators ought to be tested in order to check if they issue correct signals and the exchange of signals is proper. In that moment the system can be started with production material and the optimization can be executed. It is also crucial to conduct different tests such as safety criteria tests. If the system is optimized and passed all safety tests as well as the final acceptance test the personnel intended to operate it can start the training in order to get ready for the production.

### **Keys to relocation project success**

According to Reb Stivender<sup>6</sup>, who is an expert from a well-known company CH2M HILL, relocating a manufacturing facility can be extremely challenging. He suggests considering the following check list to help ensure the success of the project:

1. Verify all equipment information.
2. Decide if out-of-condition equipment should be repaired, upgraded and relocated vs. replaced.
3. Check with code officials at the receiving facility location.
4. Develop a detailed relocation project schedule.
5. Coordinate structural and utility designs.
6. Communicate with appropriate personnel and contractors throughout the entire project.

There are many other important issues which can contribute to the success of the relocation. One of them is taking photos from every side of the equipment before its

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<sup>6</sup>R. Stivender, *A checklist for success*, "Plant Engineering", January 2009.

disassembly. This can help avoid much uncertainty and save time during reinstallation. Another important detail is paying attention not only to what is on the ground but also overhead. Some cranes or conveyors may not appear on the layouts but their presence must be noted. Finally, the chief engineer in charge of the project has to be selected carefully as this position requires a lot of expertise, experience, reliability and ability to work under pressure as well as creativity and flexibility in order to face unexpected difficulties.

Relocation of a factory is undoubtedly a project which is Specific, Measurable, Ambitious, Relevant and Time-bound, that is why can be subjected to all project management tools. The use of modern project management software facilitates preparing Gantt charts, allows the execution of Critical Path Method analysis and many more. Finally, the whole process can be based on a ready project management methodology such as PRINCE2 which ought to, if applied correctly, improve the performance.

## Conclusion

The process of relocation is very complex and difficult, however, there are many similarities among different relocation projects which allow to create the general methodology of relocation, especially if this is supported by the knowledge of project management. Knowledge of standard sequence of relocation, its threats and success factors is necessary in planning any relocation project.

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