Chapter 14
Operational Production Structures Used in the Multi-Serving System

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ABSTRACT

In terms of organisation, the production achieved by polyservice of machines and equipment implies the existence of some independent organisational links. The organisation of the polyservice activity by departments and workshops inside of which great importance should be given to the system of grouping the machines and equipment, studying the optimal conditions to locate them. Organising the production by single or multiple object, continuous or discontinuous flow, manufacturing lines takes into account: the parameters of the flow line, parameters concerning the labour force, the parameters of the machine-tools, technological parameters, etc. Another form of organising the production obtained through polyservice is the production departments in the composition of which there are numerically and automatically controlled machine tools. Organising the production obtained through polyservice may also be done in production departments, in the composition of which there are the transfer machine-tools, processing centres, and manufacturing cells. Organising the flexible manufacturing systems takes into account: the number of benchmarks that will be processed, reduction of the duration to design and make new products, typification and modulation of SDVs, equipping the machines and equipment with standardised SDVs, etc. The most efficient organisational form is the production departments in the composition of which there are the flexible manufacturing cells provided with industrial robots.

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ORGANISING THE PRODUCTION BY DEPARTMENTS (WORKSHOPS)

This structural form, directed according to the technological procedures, is realised by taking into account the character of the series and degree of complexity of the part (parts), consisting in universal machine tools, professional machines, processing centres that may be assisted by manipulation robots and transportation.

From analysing the costs incurred by operation for this form of structural organisation, it may be noticed they are directly influenced by a series of transportation disturbances and immobilisation of materials and half-finished products, by the relatively long transportation circuits, additional manipulations and even by finding out certain scraps (Chase, Aquilano, & Jacobs, 2004).

In order to optimise the processing actions and to reduce the expenses, it is firstly required to optimise the “connections” between the part and machine and connections between machine-machine.

Importance must also be however given to the manner of grouping the machine tools, studying the optimum location conditions. If a priority is taken into account regarding the sequence of operations and the preferential sequence of location is considered, then a reduction of expenses is obtained, which are caused by operation, as consequence of reducing the expenses for transporting and handling the parts.

Applying such a method has however led to achieving a location which seems “chaotic” from a formal point of view, as the groups of machine-tools are not created depending on their physical similarity, a location which however consists in an inner sequence corresponding to the flow of half-finished products.

The method of placing the production means based on this principle begins with studying the requirements of processing all benchmarks that are to be manufactured and the features of production means, which compete in their processing.

Regarding the location of the production means, the connection links shall be taken into account, which underlie the achievement of location optimisation, but the feature of the benchmarks to be processed, number of machine-tools of same kind, etc. must also be considered. A location may be thusly obtained which would lead to lowering the transportation and manipulation expenses.

Applying the multi-serving system to this organisational structure form of the production means indicates some difficulties due to the complexity and multitude of elements due to the complexity and multitude of elements that must be taken into account. The ratio between the machine time and auxiliary times characteristic to the processing procedure must be particularly analysed.

ORGANISING THE PRODUCTION BY LINES OF FLOW MANUFACTURING LINES

The structural form of organisation by “object” is a higher form of the processing procedure, which can be applied under the conditions when the production serial feature allows the application of the flow manufacturing organising system.

From studying the similarities of the parts to be processed, directed towards emphasising the technological analogies, conditions for grouping several similar parts may be achieved, which shall lead to increasing the serial feature of production.

However, in this case there also occurs a diversification in that it is necessary to process simultaneously some sets of different parts. In order to be able to realise the serial feature, the batch of parts should be changed more frequently, thusly creating the conditions for successively processing some finished products (Courtois, Pilet, & Martin, 2000).

The problem of rationalising the organisation of flow manufacture, for the small and medium production with a high degree of diversification, lies in organising technological lines with an increased
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