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SYSTEM APPROACH OF ASSET VALUATION MOULDING MACHINES

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Abstract: The system approach is one of the possible human approaches to the implementation of various activities, especially those that are associated with various types of analysis of objects and processes that take place on them, with cognitive processes, solving common and professional problems, but also activities such as thinking or acting. The contribution addresses the problem of the systemic concept of asset valuation. The main challenge is to present the systemic concept in practice. The issue is analyzed in the form of a case study on moulding machines. The paper contributes to the objectification of approaches to the valuation of moulding machines allowing experts to base their subjective assessments on objectified valuation material and thereby create the conditions to further develop methods for valuing machines based on clarified and generalised approaches.
Keywords: system approach, system of essential quantities, valuation, usefulness

INTRODUCTION

The value of moulding machine, as well as other movable property, depends on its usefulness. In valuation, it is generally true that the higher the usefulness of the valued object, the higher the possible utility of the entity with the right to the object, the higher the value of the object for the eligible entity, and the higher the achievable price at its eventual sale [1].

Usefulness expresses the satisfaction of the needs brought to the consumer by the consumption of goods and services. Usefulness depends on the quantity of goods and services consumed, their characteristics, their quality, as well as the subjective feelings of the consumer. Usefulness in economics is expressed in monetary units [2].

The usefulness thus depends on the characteristics of the valued moulding machine (its design and condition), the characteristics of its surroundings (its design and condition) and the possibilities and method of handling the valued moulding machine. The most common method of valuing machines is market-based. The value of the machine is determined by comparison with identical or comparable machines for which price information is available.

As reported by International Valuation Standards [3], the market approach is applied in the case of a sufficiently large market and executed transactions. The subject of the transaction should be substantially similar assets. These criteria are often not met. A market-based approach can be applied even when those criteria are not met, for example assets are not sufficiently similar, the differences between them are significant. However, in this case, a comparative analysis of the qualitative and quantitative similarities and differences between comparable assets and the asset being measured needs to be made and the necessary adjustments made.

Approaches to the valuation of moulding machines are known. But solving these problems is not easy. These are always complex problems where the level of solution is very significantly influenced by the expert's level of expertise, subjectively. One method for solving complex problems is a system approach.

The system approach is one of the possible human approaches to the implementation of various activities, especially those that are associated with various types of analysis of objects and processes that take place on them, with cognitive processes, solving common and professional problems, but also activities such as thinking or acting. It is a tool of scientific and practical knowledge, contributing to the effective implementation of cognitive processes and thus to the solution of problem situations on structurally and procedurally complex entities, regardless of their sectoral nature. The system process is then a generalized problem-solving algorithm, respecting the system approach, requiring system thinking and using system methods [4].

When solving problems using system theory, it is necessary to distinguish between a real system and an abstract system. The real system is [5]: „at some level of resolution, a structured real or abstract entity with system properties.“ We understand the abstract system as [5]: „abstract entity, purpose-built on entity Ω (real system) from the point of view of the solved problem.” It is usually a system of essential quantities and includes those characteristics that are essential for solving the problem. In solving the problem, it is then necessary to apply those system approach attributes that describe the material facts in relation to the analysis of the assessed object.

The essence of the scenario for solving causal situations [5] lies in this consideration: „an entity with certain properties is influenced by the environment and subsequently influences this environment“. In the context of this definition: „It is characteristic of each entity Ω that it has a certain environment, shape (geometry), and that in the surrounding area, it occupies a certain position (topology). It has certain ties with the environment, through which interactions are realized that activate and influence the entity. The entity manifests itself in its environment in a

certain way, which has certain consequences. If an individual of the above characteristics of an entity, that is from the surroundings, topology, geometry, bonds, activation, influence, processes, conditions, expressions and consequences, thus, from the set of characteristics $\chi(\Omega)$, selects those, that are essential for solving a specific situation, receives a set of essential parameters $\Pi(\Omega)$ and of which the system of essential quantities $\Sigma(\Omega)$.

CREATING A SYSTEM OF ESSENTIAL QUANTITIES

In accordance with the system approach, it is appropriate at the beginning of the solution of any problem, hence the valuation, create a system of essential quantities $\Sigma(\Omega)$, whose completeness and level significantly influence not only the approach and choice of method to solve the problem, but also the credibility of the results of its solution. This system is divided into seven subsets of quantities, that comprehensively describe all the essentials, what is related to solving the problém (Figure 1).

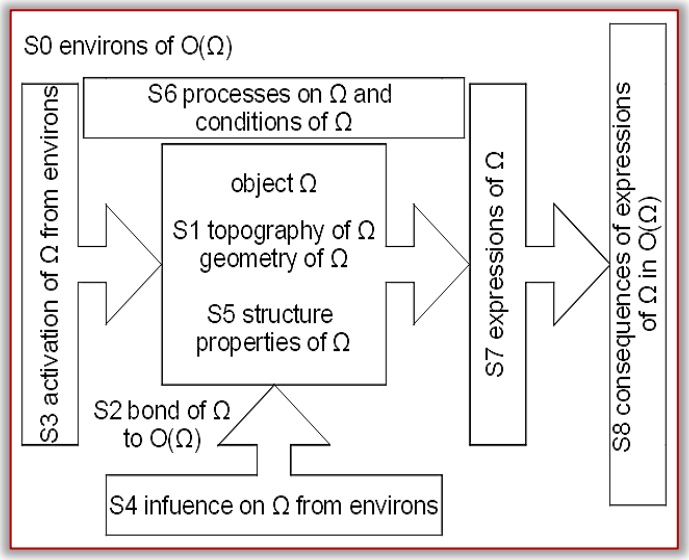

Figure 1. Subsets of quantities of the substantial quantities system Σ(Ω); modified [5]

Technical-economic expertise deals with property valuation, solves problems based on knowledge of structure, activation and influence, assesses the conditions and quantifies expressions (i.e. the potential benefit from the point of view of the entity from whose point of view the valuation is made) *[6].*

The case study is focused on the technical object of the moulding machine. Based on the above facts, the valuation problem can be formulated as follows:

„Analyze usefulness of the moulding machine."

The formulated problem is solved on the real system's moulding machine - the press brake. The moulding machine is a system of engineering (has the ability to realize production). Is an open system (the target behavior is influenced by the properties of the environment), fully structured, dynamic (properties are variable with time) and stochastic (quantities describing the quality of the moulding machine have a random character). From the above characteristics, it can be concluded that it is a hard system. The moulding machine has its usefulness, for which it generally applies, that the greater the usefulness, the greater the value of the machine and the greater its achievable price in the event of a sale. The usefulness of the moulding machine depends on the time, for which it maintains an acceptable level of properties (quality). Primarily, the quality of the moulding machine is based on functional characteristics, further safety, durability, economy, ecology, etc.

Subsets of systems of essential quantities $\Sigma(\Omega)$ contain these quantities:

- Subset S0 – Environmental quantities describe the environment in which the moulding machine is operated, temperature conditions in the workplace, etc.
- Subset S1 – Object quantities express the location of the moulding machine in the workplace, the distance from other machines.
- Subset S2 – Binding quantities describe substantial bonds with the environment and the interactions that take place there (moulding machine-subject).
- Subset S3 – Activation quantities are design, quality of production, operation or disposal of the moulding machine.
- Subset S4 – Influential quantities may describe, for example, the setting of the moulding machine, maintenance, repairs and service.
- Subset S5 – Field quantities express the properties of the moulding machine. The properties depend on the design of the moulding machine, resp. its structure and condition. Structures can be analysed due to structure groups (Figure 2). The structure of the moulding machine allows its function.

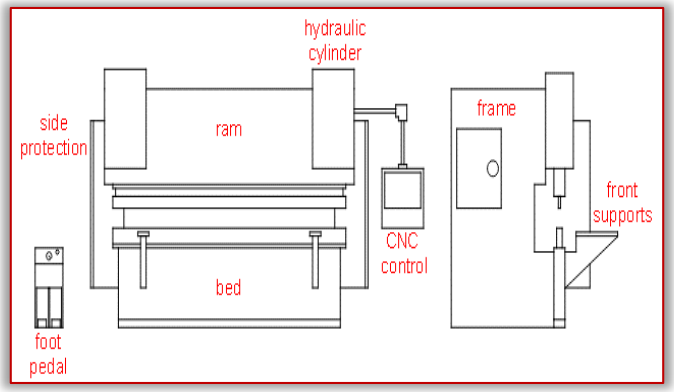

Figure 2. Some elements of a typical CNC hydraulic press brake; author

The properties of the moulding machine are described by many parameters and due to technical progress and developing new technologies and functions. It is a dynamic parameter system (e. g. compression force, bending lenght, stroke).

- Subset S6 – Process quantities describe the processes taking place on the structure of the moulding machine. These quantities put the moulding machine in a different technical condition. The technical condition of the moulding machine is described by condition variables, that describe its properties at a particular time. Technical state of the moulding machine may take values from the interval < excellent; unsuitable>.

— Subset S7 – Expression quantities is benefit to the subject. This depends, for example, on the quality of the products, the operability of the moulding machine, the profitability of repairs of the moulding machine.
— Subset S8 – As a result of the decrease in the level of properties of the moulding machine, its usefulness also decreases (the value decreases).

For this type of problem (valuation problem), the inputs to the solution algorithm are quantities from the subset S0, S1, S2, S3, S4 and S5. The output is then the quantities from subsets S6, S7 and S8. Of the subsets of all characteristics, only essential characteristics need to be considered. It is important to take these quantities into account when quantifying the usefulness of the moulding machine and expressing its value.

CONCLUSION

To solve valuation problems in expert activities, it is appropriate to apply a system approach. A system approach is a tool of scientific and practical knowledge, contributing to the effective implementation of cognitive processes and thus to the solution of problem situations on structurally and procedurally complex entities, regardless of their sectoral merits. The system $\Sigma(\Omega)$ is an abstract entity, purposefully created by the subject on the entity Ω (system) from the point of view of the solved problem. The formulated problem is solved on the system of the moulding machine and its usefulness is analysed. Following the detection of significant quantities related to the problem, the standard method of calculating the value of the moulding machine is chosen. From the above the author concludes that the presented procedure is an important step that can lead to the right conclusion and verification of results in the valuation reports.

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