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ABOUT SIMULATION MODELLING OF WATER PURIFICATION PROCESS

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Abstract: *On the basis of the theory of general system analysis, complex discrete process of water treatment has been studied and classified. The integral conceptual scheme of investigation and simulation of the complex water treatment process based on the principles of the general system approach has been introduced.*

Key words: *water treatment, water treatment plant, simulation.*

1. INTRODUCTION

In the development of a simulation model, first of all, must be chosen a conceptual framework for describing the simulated water treatment system. This scheme should be based on a specific methodological approach, in which described the functional relationship of water purification systems [1]. If imagine that the water treatment system is a complex set of interconnected buildings (chemical plant, mixers, settling tanks - illuminators, filters, chlorinators), it's clear that water treatment is complex ongoing process.

At the same time, in this complex processes presence of the operator (human) is unavoidable as a system chain. It causes a system of wide methodological approach used for the survey of water treatment systems.

2. THE BODY OF THE ARTICLE

In this case, the term "system" is a relative term. In system approach a certain set of elements can be viewed only as a small part of the larger system or subsystem. On the other side of the same body can be in the center of interest of researcher and therefore this may itself be considered as a system [2].

The scope of any simulation model determines the features of the problem, for which solutions developed this model [3]. To determine the scope of the waste-water treatment system, first, it is necessary to identify all of its borders of study and composition. During determination of the boundaries of the system there are identified not only the physical, but also the causal link between its constituent elements.

In general simulation modeling variables of the model may vary discretely, continuously or as continuously superimposed discrete jumps. Time changes either discrete, or continuous.

In the process of water treatment, it is desirable to present variables as discrete (these elements may be individual equipment and construction of water treatment systems, water flows, etc.) that are included in the simulation model and called its components. It should be noted, that a human can also be regarded, as a necessary component of the system.

Feature of digital simulation is the ability to play interactions involving all components of the system. For this must be separated temporary state of the system and described actions that transfer them from one variable state to another. Thus, imitation is the dynamic "portrait" of the system's state in time.

During discrete simulation system status can be changed in time of the event and may vary by its movement in time, from the perfect event for the new.

The relationship between the concepts of the event, the action and the process of water treatment can be represented by the following scheme (Fig.1).

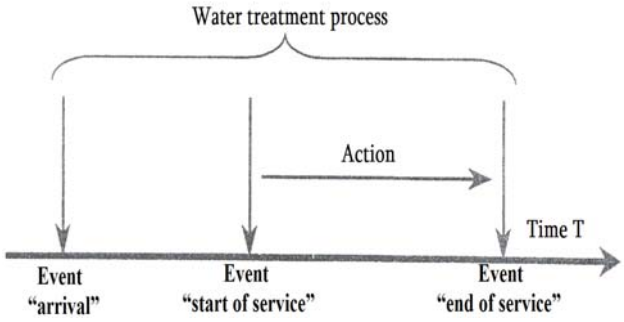

Figure 1. Schematic diagram of the water treatment process

The event culminates in the moment, when a decision is made about the end, or the beginning of a new action. The process of water treatment is oriented in time sequence of events, which may consist of several technological processes, leading to a specific goal (the desired quality of water treatment).

Note, that in the process of water treatment can be influenced by various factors, so that account certain reliability is not always possible.

However, if they are it's possible to take into account (even partialy) then,

- or including these factors in system;
- or neglect them;
- or considering them, as inputs to the system.

If external factors are considered as inputs into the system, it is assumed, that they are functionally defined by a value, the empirical data tables or equations.

3. CONCLUSION

Thus, the whole process of water treatment is a set of interacting elements, that may influenced by external factors, in addition to factors such as finance, organisational, logistical, economic and others.

Fig. 2 shows a simplified model of water treatment

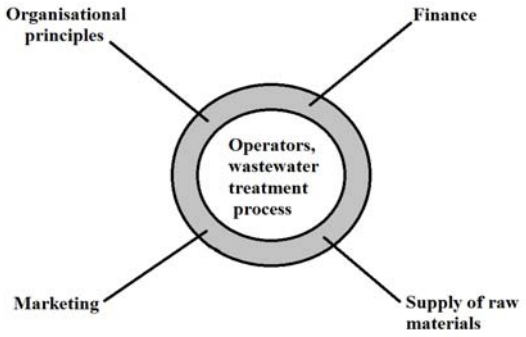

Figure 2. The basic model of water purification

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