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THE FUNCTIONALITY OF INDUSTRIAL CONTROL VALVES IN THE STATION OF DEFECOSATURATION

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Abstract: *The use of automatic industrial control valves allows you to withstand in a given mowed the maintenance of the process that takes place at the defecation station. With the help of the follower drive, the valves support the automatic control circuit: the ratio of diffusion juice to lime milk with milk density correction; the ratio of diffusion juice - the return of the juice I (II) of saturation or suspension of carbonation I (II) juice; first and second carbonation; process of purging from the sand preddefektora, defecator. The technology of control valve choice based on the analysis of static characteristics of the control object where it is shown that the dimension valve for the expenditure equations, and flow characteristics, valve operation is considered separately from the regulatory framework. The flow characteristic of the valve takes into account the change of fluid flow. When operating the process facility was investigate, the results of the automatic control system with the selected valve, in particular, the static characteristic of the control channel. With the help of the experiment examined the behavior of the object with a particular regulatory authority to determine the size of the valve. To assess the applicability of a particular valve size, it is propose to use the integral variability characteristic. Such an assessment is a quantitative assessment of information contained in a deterministic process. The work of control valves allows you to maintain parameters of technological processes and to increase the cleaning effect of the juice and sugar yield, reducing sugar content in the molasses, reduce fuel consumption and milk of lime.*

Keywords*: Valve, adjustment, cleaning, drive, sugar, consumption.*

INTRODUCTION

Sugar production requires quality preparation of sugar beet for further processing. Under the condition of contamination of sand from badly washed beets, the plant clogs heaters of circulating juice of column diffusion apparatus, which requires an increase in the number of purges of juice at the plant defecosaturation. The poor classification of waste from the washing department, which is carried out on the basis of such obsolete equipment - as a 2-drum classifier, leads to the loss of about 3.0-6.0% in the washing stations in the beet mass, the mass fraction of 10-20 mm, suitable for industrial processing with the provision of commercial sugar. (Yurkevich V.D. , 2004)

My departments of sugar factories, as shown by the results of various reconstruction of washing facilities at different enterprises, should provide the following performance indicators: cleaning of beets from light and heavy impurities - 100%; laundering of beets to residual pollution - 0,06-0,12% to the mass of beets; return to the production of conditioned mass in the amount of 3,0 6,0% to the mass of beets suitable for industrial processing with the provision of obtaining from the mass of commodity sugar; the cost of pure water for a beet sink - 25 ... .30% to the mass of beets. (Shilin A.A., 2014) At the same time, the loss of sugar, due to the infection of the diffusion medium, the dirt entering the diffusion apparatus with beet pulp from contaminated beets, is about 0.66% to the mass of beets. Thus, ensuring high performance of washing depots is an urgent task for sugar factories and a guarantee of energy saving.

EXPOSITION

Consider one of the standard technological schemes of the washing plant of the sugar plant. Consider the high efficiency of the proposed scheme for cleaning beets from heavy and light impurities, as well as high efficiency in laundering beet from dirt using a small amount of pure water.(Kucuk, K., 2011)

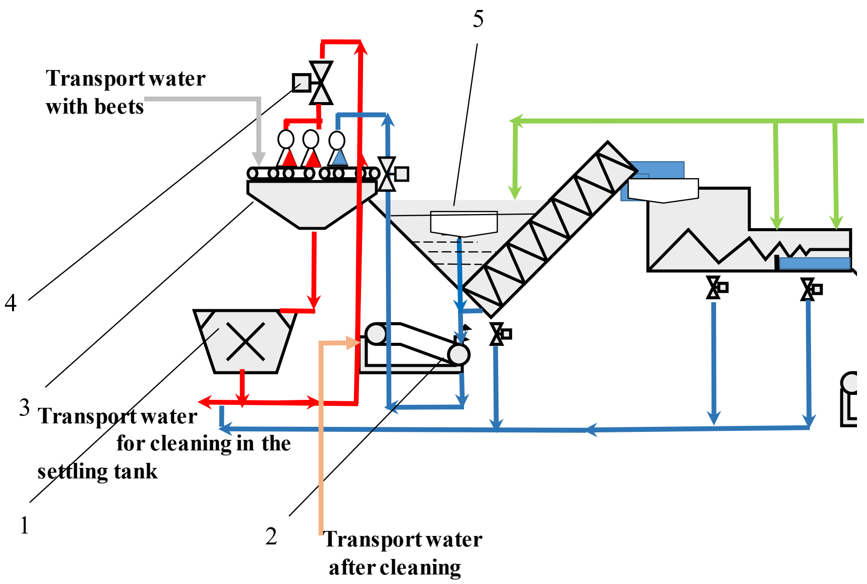

Fig.1. The general technological scheme of the washing plant of the sugar plant: 1 - vibration sito; 2 - cell separator; 3 - water separator №1; 4 - Positional control valve.; 5 - rinse aid number 1.

As can be seen from Fig. 1. clean water in the washing compartment is used: on water separators №2 for jet washing of beets, on the 2nd cascade of water separation and in rinse aid №2. Then pure water, introduced into the rinse aid number 2 and used in the rinse aid number 2, is taken from the circulatory contour of this rinse aid number 2 and enters the beet groove cornice or drum. Pure water in a beet root is not used. In a beet mixer only water used in the rinse aid number 2 is used. Water from the circulatory contour of this rinse aid number 2 also comes in the rash №1. In this way counter-current motion of water is organized in relation to the movement of beets in the washing room.The nozzles above the water separator №1 for jet cleansing and laundering of beets - can work on conveyor water, which is cleaned on vibrosite, or on conveyor water after radial septic tanks, or on water from the circulatory contour of the rinse aid №1.

The design of the nozzle also provides: easy adjustment of the width of the gap for the passage of water through the nozzle; providing easy cleaning of the nozzle when it is clogged with impurities contained in water. The nozzles must provide: use of water with the inclusion of a solid fraction with dimensions of about 5 mm; the total flow of water for the jet washing of beets to the water separator № 1 in the amount of about 80-150% to the mass of beets with a pressure of water at a level of 2.5 kg / sm^2. The water pressure, which is fed to the nozzles, determines the speed of the nozzle's water. As can be seen from Fig. 8, under the condition of water pressure P = 2.5 kg / cm2 - the velocity of water from the nozzle is V = 22.5 m\s. In the course of the analysis of the work of the site with nozzles over the water-divider # 1, we proposed a modernization of the control system of the VL10 (Camozzi) control valve associated with the nozzles (Fig. 2).

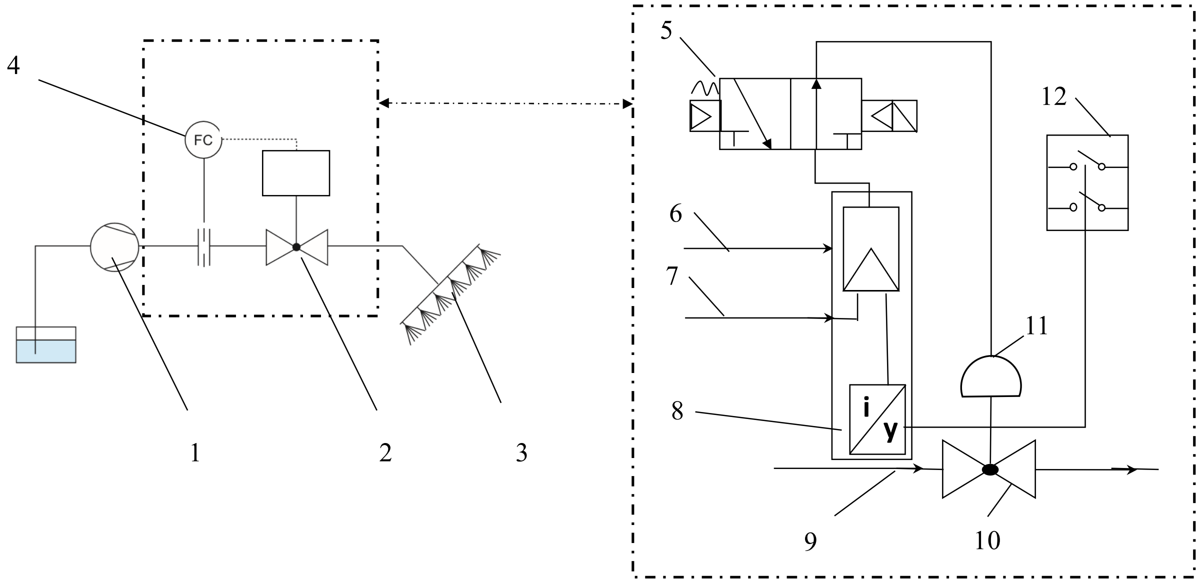

Fig.2. General scheme of control of nozzles over water separators № 1: 1 - pump; 2 - a regulating valve with a position actuator; 3 - nozzles; 4- flow regulator.

Thus, the static transfer function describes the relationship between the input signal and the area of throttling. The flow of the valve (more precisely, the position of the plunger) is a significant intermediate parameter of this sequence of signals. The design of the valve plunger, in accordance with the stroke control, provides a larger or smaller throttling region, from the initial value to its maximum value. The ratio of the maximum value to the initial determines the amplitude (range of changes). The nature of the change between these values is described by the characteristic of the valve. Characteristic of Fig. 3, obtained experimentally, makes it possible to take into account the relationship between the coefficient of flow capacity and the position of the plunger on the valve. In practice, they are usually chosen between linear and equilibrium characteristics (Fig. 3).

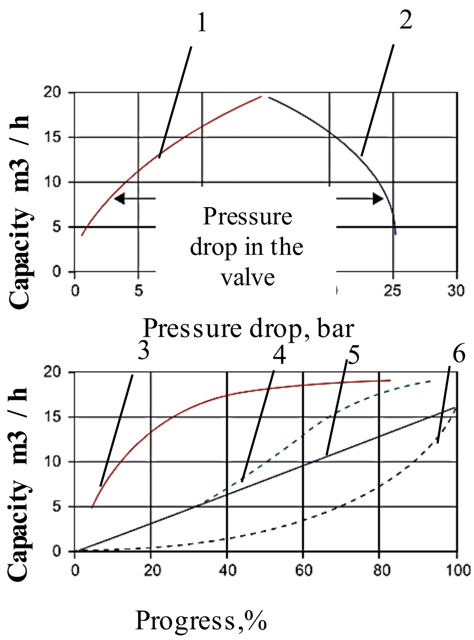

Fig.3. Characteristics of the nozzles and the pump: 1 - pressure drop in the nozzle; 2 - differential pressure on the pump; 3 - characteristic of the costs of a positionally controlled valve controlled by a linear characteristic; 4 - characteristic of the wicket of the positionally controlled valve controlled by the equilibrium characteristic; 5 - linear characteristic of the valve; 6 - the equilibrium characteristic of the valve.

Characteristics of spray nozzles and pump operation are shown in Fig. 3, which shows the effect of valve characteristics (linear or equilibrium) on the characteristics of the installation. The boundary conditions are the external pressure of the nozzles and the level of liquid in the reservoir, which is supposed to be constant. If for the pass valve there is no specified technical characteristic, for economic reasons, it is rational to choose a linear characteristic.

CONCLUSION

With the equilibrium characteristic (Fig. 3) there is a recommendation to choose a control valve with a larger value of Kvs (nominal throughput). In most cases, a perforated plunger with an even-ratio characteristic requires large saddle diameters or higher stroke and, consequently, large drive forces. For rational control of the valve, it is advisable to install a positional pneumatic actuator for the conversion of signals (at a pressure of 0.2 - 1.0 bar or an electric current of 4 - 20 mA) in the drive. The positional pneumatic actuator together with the control valve forms a control circuit that controls the whole process.

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