

MILK ACCOUNTING SUBSYSTEM FOR LIVESTOCK FARM

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A modern milking and dairy department of a livestock farm cannot function effectively without automatic control systems and control systems of technological process parameters. Currently, such systems are widely used in various milking facilities, but until recently there were no information systems for a milking facility with a milk pipe and individual accounting of milk obtained by each individual milker, although they are the most widespread in Ukraine [1, 2].

Employees of the Department of Information Technologies of the Uman National University, in cooperation with the enterprise "AGRO-PROMSERVIS" [3], developed and created an experimental sample of the information system "IS-Milkline", which is an innovative solution for a milking plant with a milk pipe and individual milk accounting, in which modern "Internet of things" technology is used and the "Farm in a smartphone" concept is implemented. The "IS-Milkline" information system allows the user at any time (using a smartphone, personal computer or tablet computer) to receive information about the parameters of the technological process of cow's milk production, to monitor the events that take place at the milking plant, identify emergency situations and facts of violations of work regulations by the farm staff, perform livestock accounting. The system consists of DM-03 electronic milk dispensers, BUAP-04M washing machine control unit, VPC-1 or VPC-1 vacuum pump control unit, and IB-M interface unit.

The IB-M interface unit is designed to receive data about events occurring at the milking plant, to record the date and time of these events, process the received data, present them in the required form, and transmit this data to the user via the Internet. The DM-03 electronic milk dispenser is designed to control the executive system of the dispenser, count and display information about the number of portions of milk received by individual milkers, transfer data about the milking result to the IB-M. The VPC-1 vacuum pump control unit is designed to record the date and time

of the vacuum pump on and off and transfer this information to the IB-M. The VPC-2 vacuum pump control unit is designed to record the date and time of the vacuum pump on and off, measure the instantaneous and average value of the vacuum pressure, and transmit this information to the IB-M. The BUAP-04M washing machine control unit is designed for automatic control of washing processes, control of washing process parameters, and transmission of information about washing process parameters to IB-M.

With the help of "IS-Milkline", the following typical emergency situations and violations of work regulations are effectively detected: interruption of washing in order to leave the workplace; execution of the shortest program "Pre-milking wash" instead of other programs; failure of the water supply system on the farm; malfunction of the water heater of the washing machine; unauthorized shutdown of IBM; change in the average duration of milking, which is an important indicator of the work of milkers [4, 5]; unauthorized change to BUAP-04M settings; the average value of the vacuum pressure is unacceptable.

By analyzing the sequence of events that occur on the farm, it is possible to establish the fact of deviation from the work schedule by the farm staff, and in certain cases, it is possible to carry out remote diagnostics of the milking equipment.

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