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OPTIMIZATION OF THE MONITORING PROCESS, THROUGH THE USE OF THE TOOL: PI VISION

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Abstract: Aiming to keep up with technological advances and the market's high tendency to use data to make increasingly agile and assertive decisions, the operation cell of the Water Pole of the Regional Management Unit (UGR), located in the Itaquera neighborhood, seeking to improve continuous improvement of its processes, started using the *PI Vision* tool to create easy-to-view panels that provide real-time data from telemetry equipment to monitor the region's water distribution system. Through the use of these panels, it was possible to optimize the monitoring process, reducing the time spent in carrying out the readings of the equipment, obtaining more agility in decision-making and, consequently, improving the efficiency of supply for the population served. Markets are adapting to global growth and the information revolution is reducing the time available for effective decision-making (SOUZA, 2009). The present work seeks to show the application of the data visualization tool (*PI Vision*), contributing positively to the productivity gain and optimization of the equipment monitoring process of the operation cell of the Water Pole of the UGR.
Keywords: Optimization, Monitoring, Supply.

INTRODUCTION

As a result of the population growth of cities, meeting the sanitation demands of the population is a major challenge faced by companies in the sector. At Sabesp it is no different, and sanitary engineering projects are developed at all times in order to guarantee regular supply to the population. As a consequence of this development, the number of equipment to be operated and monitored has also been growing every year.

Based on this scenario, it was noted that the method being used to monitor the equipment was demanding, every day, more time and effort on the part of the operators. Soon, the operation cell of the Polo Água da UGR, seeking to optimize the monitoring process, changed the method and started using the *PI Vision* tool to create simple and easy-to-view panels to monitor the equipment more quickly, generating gains in productivity and contributing to improving the efficiency of the water supply system for the population.

Mirshawka & Báez (1993), argue that the struggle for tools that help increase productivity must extend to all areas of the company, eliminating everything that does not add value to products, services, tasks and people.

OBJECTIVE

Show tool application *PI Vision* in the elaboration of monitoring screens, contributing to the optimization of the process of reading and analysis of the equipment with telemetry of the Regional Management Unit.

WATER OPERATION CELL

The UGR Water Pole Operation Cell, located in the Itaquera neighborhood, has the main objective of contributing to the operation of the entire supply system in the region with the best possible efficiency, through monitoring and operation of equipment such as Reservoirs, Pumping Stations of Treated Water (EEAT's), *Boosters* (Pressure Pumps) and Pressure Reducing Valves (VRPs). It must be noted that the water operation cell model presented is not unique and may vary according to the characteristics and needs of each Management Unit.

SCADA-TYPE SYSTEM MONITORING METHODOLOGY

According to Grandson (2021), *Supervisory Control And Data Acquisition* (SCADA) - Supervision and Data Acquisition System, in short, is the system responsible for controlling and monitoring plants through

communication with sensors and actuators. They make it possible to manage the process remotely, bringing security and convenience to users. They are capable of collecting and processing data in real time, sending commands and processing information.

At the UGR Water Pole, the SCADA-type system was used to monitor all Water Pumping Stations and *Boosters* operating in the UGR region on a daily basis.

This way, the operators had to visualize each piece of information, of each piece of equipment, individually, generating a great deal of effort and time spent in carrying out a complete reading cycle of all the equipment, as the data to be verified were often left on screens. different as shown in Figure 1.

Below are the basic items needed to read a pumping station for water and *Booster*, according to Table 1 and 2.

We emphasized that these are the basic checks of the equipment. If the checked items are all within the parameters, the Station or *Booster* reading is finished and the operator moves on to the next piece of equipment to be checked. However, if any abnormality is found in the verified information, the operator will take more time performing a more detailed analysis to identify the cause of the problem.

Therefore, knowing the effort and time spent to carry out a complete cycle of reading all the equipment and that these are repeated several times a day, the team at the Water Pole of the UGR created unique monitoring screens using the *PI Vision*.

MONITORING METHODOLOGY BY THE VISUALIZATION SYSTEM *PI VISION*

Initially, it must be clarified that the two systems are interconnected, so that one depends on the information provided by the other. In this case, the PI Vision system searches the SCADA system for the necessary information to create, visualize and analyze the data. It is important to emphasize that the use of the SCADA system is still necessary, as it is through it that it is possible to remotely command the equipment.

The *PI Vision* is data visualization software that allows us to create advanced process monitoring dashboards in minutes with intuitive drag-and-drop (OSISOFT, 2022) tools. The panels are flexibly designed according to the user's needs, making it much easier to view information and, consequently, speed up understanding and decision-making.

As mentioned earlier, one of the advantages of using *PI Vision* is that it allows us to create and customize screens according to the user's needs. However, the initial intention was to create simple and intuitive screens containing only the information really necessary to carry out the monitoring of the equipments. Therefore, two screens were created. The first (Figure 2), containing all the necessary information for the visualization of the Water Pumping Stations, and the second (Figure 3), for the visualization of the Boosters. The main information is available on a single panel, simplifying the visualization of the data necessary for reading the equipments.

By more quickly monitoring the EEATs and Boosters, through the PI Vision screens, the operator, when identifying any abnormality, can act quickly in order to avoid or minimize a possible problem in the supply system.

RESULTS OBTAINED

The monitoring method using the SCADA type system to perform the daily readings of the UGR equipment, required the operator to view at least 3 different tabs/screens for each equipment, requiring a few clicks to reach graphic information such as flow and discharge. Taking into account all the EEAT's and the *Boosters* of the UGR, to complete a complete reading cycle of all this equipment,

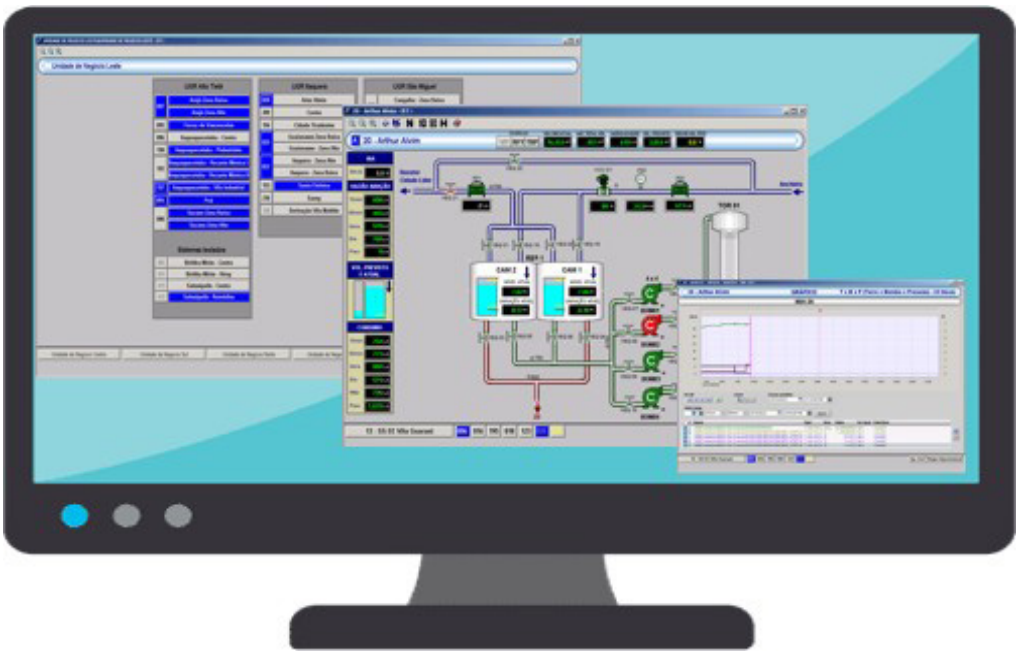

Figure 1: Example of using a SCADA-type system to monitor an EEAT.

Source: Author

EVALUATED ITEM	BASIC VERIFICATION	UNITY
Reservoir	Check if the reservoir level value is within the control limits	m^3
Pump Status	Check if the pumps are operating as programmed, by viewing the color of the Pump (Red=Off / Green=On)	----------
Repression	Check if the settlement value on the graph is in accordance with the configured parameters	mca
Critical Point (CP)	Check that the PC value on the graph is within the control limits	mca
Flow rate	Check if the flow rate value on the graph is within the control limits	L/s

Table 1: Parameters used to carry out a basic reading of a TEES.

Source: Author

EVALUATED ITEM	BASIC VERIFICATION	UNITY
Pump Status	Check if the pumps are operating as programmed, by viewing the color of the Pump (Red=Off / Green=On)	----------
Suction	Check that there is adequate suction for the operation of the *Booster*	mca
Repression	Check if the settlement value in the graph is in accordance with the configured parameters	mca
Critical Point (CP)	Check that the PC value on the graph is within the control limits	mca
Flow rate	Check if the flow rate value on the graph is within the control limits	L/s

Table 2: Parameters used to perform a basic reading of a *Booster*.

Source: Author

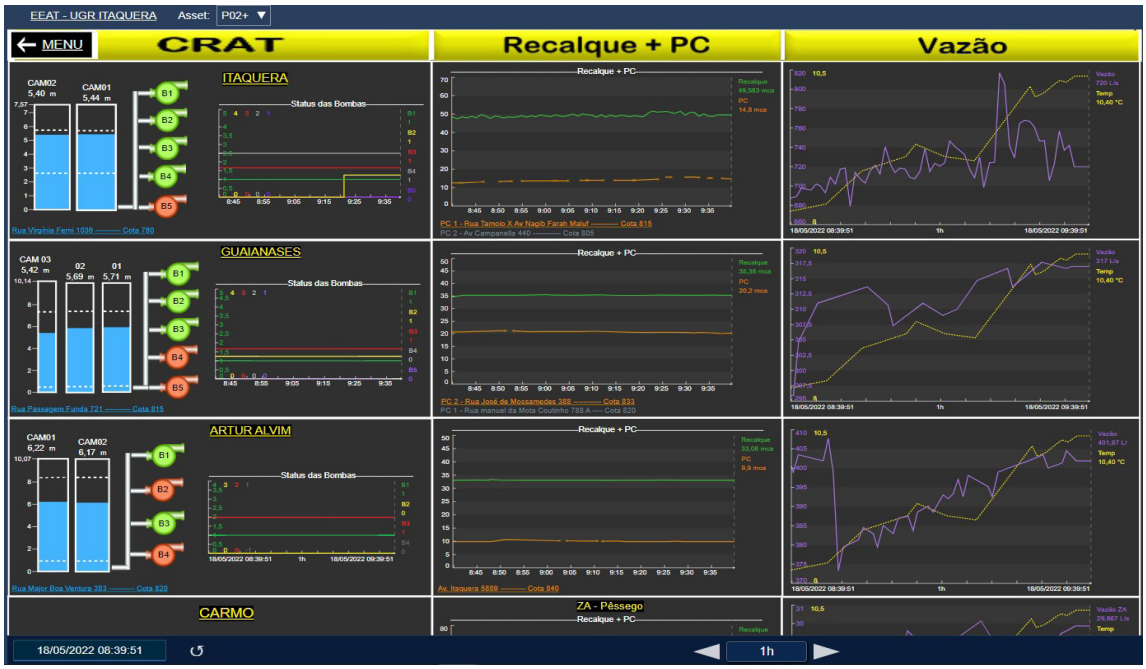

Figure 2: Screen created using the *PI Vision* tool to monitor the UGR Pumping Stations.

Source: Author

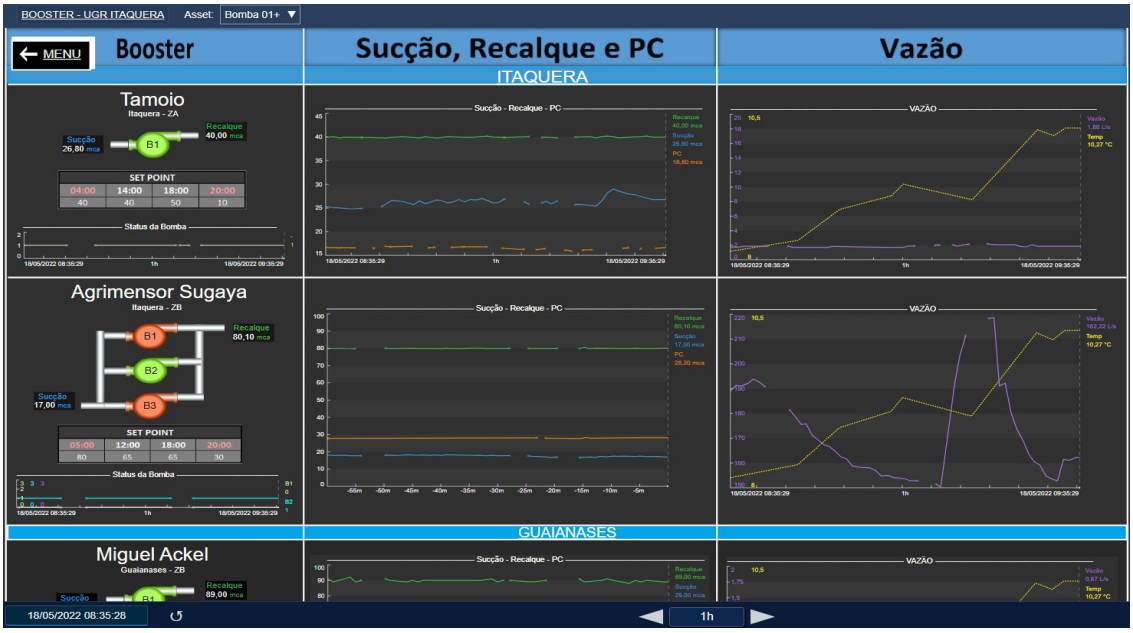

Figure 3: Screen created using the tool *PI Vision* to monitor the UGR *Boosters*.

Source: Author

the operator spent an average of 30 minutes, considering that all the equipment were operating according to the appropriate parameters.

From the use of the screens of the *PI Vision*, to carry out the monitoring, the operating cell reduced the average time of a complete cycle of reading all the equipment by about 80%, that is, from 30 minutes to an average of 5 minutes per complete reading, optimizing the time and gaining productivity in the process. In addition, the system provided historical verification and facilitated comparative analyzes of all equipment together. As a result, it is possible to make decisions more quickly and improve the efficiency of the supply system, benefiting the population served by the UGR.

In addition to the reduction in reading time and the gain in productivity, with the use of PI Vision screens for monitoring, operators observed other benefits, such as:

a) easier and more intuitive visualization;

b) centralized data and information;

c) efficiency gain in more detailed analyses;

d) gain in agility in decision-making;

e) gain in supply efficiency.

RESULTS ANALYSIS AND DISCUSSION

It is important to highlight that, with the positive results obtained, the operation cell of the Water Pole of the UGR, will maintain the use of *PI Vision* as a tool for monitoring and analysis of EEATs and *Boosters*, and will continue to explore the tool in order to accompany the growth of the number of equipment operated and monitored by the UGR. This way, the expectation is to obtain further improvements to the process, bringing efficiency to the supply in favor of the population served.

FINAL CONSIDERATIONS

Through the use of this tool, it was possible to obtain productivity gains for the Polo's operation cell team, optimizing the monitoring process.

There was an average reduction of 80% in the time spent to complete a complete reading of the EATs and *Boosters* of the UGR, which was understood as a satisfactory result. The result contributed to the agility in decision-making, improving the efficiency of supply for the benefit of the population served.

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