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Abstract

Summary:

A series of dashboards developed in house in Manifa facilities reduce the risk of failures and off-spec products by online monitoring of chemical injections. These dashboards compare the chemical injection rate against a target flow rate or lab sample results to guarantee compliance with the targets while monetizing the chemical injection to encourage optimum injection of the chemicals. These dashboards are not affected by missing or inaccurate flow measurement since they rely on tank level measurement for calculating the consumption while automatically filtering any tank filling and draining. Moreover, the series of dashboards predict the last date required for ordering the chemicals to ensure their availability at all time.

Details:

We are on a digital transformation journey, which is part of the Internet of Things (IoT), leading to an exponential positive change in compliance and optimization within the organization. The journey started with the chemical dashboard, since monitoring chemical injection is crucial. The traditional way is by manual calculation, which requires hours of effort and dependency on human input, which can lead to inaccurate results. Digitalization has the advantage of speed and accuracy. Thus, a series of dashboards have been developed fully in-house for online monitoring of the chemicals injection, as well as their compliance against target flow rates or target lab sample specifications. Comparison with lab sample results has been achieved by linking all the active lab results into the Plant Information (PI) system. The strength of these dashboards rely on the fact that they mainly utilize the level indicators of the chemical storage tank to monitor the consumption, while automatically filtering out all tank filling and draining. Thus, the chemical consumption is identified even in absence of dedicated flowmeters. This online calculation was achieved by programming it in the background, utilizing the Visual Basic for Applications programming language. Moreover, the consumed chemicals are monetized to ensure that the chemicals' consumption is optimized. Furthermore, the set of dashboards also show the dates to order each chemical, to ensure chemical's availability. In addition, the

start and end time of these calculations are adjustable by the user, and are not restricted to a preset time period, which is a common obstacle in the making of online dashboards.

In light of this set of dashboards, an optimization study was conducted to minimize the operating cost of keeping the crude production on-specification. This was done by adjusting the wash water to demulsifier ratio over a period of time, using the chemical injection monitoring dashboards for validation of the demulsifier and wash water consumption.

This initiative resulted in a significant potential decrease in the overall operating cost of injecting the demulsifier and wash water.

These efforts are in alignment with the Fourth Industrial Revolution (IR 4.0) of utilizing Big Data and Data Analytics, to enhance the facilities operating technologies and economics.