Digitalization – The Future of Valves and Valve Manufacture

The Future is digital. L&T Valves has pioneered the digitalization drive in the valve industry, launching IoT-ready products and processes empowered by IIoT (Industrial internet of Things). From the first customer contact to aftermarket support and beyond, the digital solutions maximise operational efficiency and customer satisfaction. The authors, in this article, has given a comprehensive account of the mentioned subject.

LAMP (L&T Valves Asset Management Programme) – Smart Valve

At the core of LAMP, it is a time-tested SIL3-capable valve, upgraded to a 'Smart Valve' by the addition of sensors and communication modules, to provide complete valve health and diagnostic information.

The parameters monitored include flow rate, upstream and downstream temperatures and pressures, gland pressure, cavity pressure, torque, vibration, valve position (open or close), number of times the valve has been operated, and the number of hours it has been running. The location of the valve can be detected through GPS for easier tracking during emergencies.

The smart valve is a patented product that communicates with an Asset Management Platform (AMP). The AMP sends data to stakeholders in two forms. The first one comprises alerts and notifications sent in raw form, especially in case of emergencies. In the second form, the data is analyzed through a data analytics platform and then presented to the stakeholders in a visual, graphic, and easy to understand format. LAMP data can be viewed by logging in to a cloud computing platform, and in the case of non-cloud solution, a wireless gateway sends the data to the AMP using a Modbus TCP.

The smart valve has revolutionized valve maintenance in user industries - from reactive (repair after failure), preventive (scheduled maintenance regardless of failure), and condition monitoring (alert based on trend for a single variable) to predictive maintenance (PdM) where equipment specific algorithm/machine learning (ML) combines multiple variables to detect issues before valve performance goes down.

The next phase of the smart valve would be to develop prescriptive maintenance where the product has the knowledge base not only to identify the issue but also to guide the technician on what to do for repairing the issue. Also, the data generated would help design a valve that is future-ready.

smART.view empowered with Augmented Reality

L&T Valves has launched a digital collaboration platform that leverages augmented reality (AR) technologies to virtually teleport customers to the manufacturing facilities, thus minimizing the limitation of distance and time. smARt.view facilitates interaction and collaboration with the subject matter experts (SMEs) in the plant and site personnel anywhere in the world through voice, chat, and annotation in the AR space.

Valv.Trac *Source L&T Valves*

LAMP *Source L&T Valves*

The technology offers customers the option to carry out remote inspection of valves before dispatch, thereby realizing significant savings in cost on account of travel by multiple agencies. The technology also enables virtual plant tours and audits for potential customers. Further, training of customers at site, especially on mission-critical flow-control solutions is a definite advantage that 'Smart.view' offers.

ValvTrac Digital Traceability

ValvTrac literally offers information at your fingertips. The revolutionary traceability solution uses RFID (Radio-frequency Identification) technology to provide the customers all documents related to the valve digitally. The passive RFID tag operates in the XF frequency band, and designed to perform in harsh environments.

The tag makes it easier for the installation engineer to know about the valve details and install the correct valve at the correct location in the system. RFID tags can offer a link to data such as customer purchase order number, valve serial number, L&T Valves sale order and line item number, material description, tag number, customer name, inspection release note, shipment release note, component name, heat no, MPI and X-ray no of castings, DPI no, etc. The tag also provides a link to online server where documents such as general assembly drawing (GAD), valve and material test reports (VTR, MTR), installation manuals, etc are stored.

This RFID tag will be especially helpful for technicians at site to quickly identify valve and troubleshoot in case of failures. Also, re-ordering of valves during expansion, or ordering of spare valve or spare parts becomes easier for buyers as all the data and references become available on the tag. ValvTrac was successfully implemented at one of the largest refineries in the world.

SPEED Digital Manufacturing Platform

SPEED is a proprietary manufacturing and project management platform that leverages digital man-machine interfaces to ensure end-to-end visibility and error-free on-time manufacture. SPEED enables collaboration across functions, facilitates concurrent decision making, and enhances transparency trust & speed.

SPEED is a platform that consolidates all the digital features on the shop-floor, planning, and supply chain. It achieves on-time delivery through backward scheduling. SPEED also guarantees weekly and daily plans that is digitally displayed on the shop-floor. The displays also show actual production status against the plan.

During manufacturing, RFID technologies provide 100 percent visibility to major components, and ensure on-time error-free manufacturing. In addition to RFID, barcodes are used internally at the plants to track the progress of major components. A traveler card (TRC) attached to valve components also enhance visibility as they advance through various stages of machining, assembly, and testing. Confirmation done at every stage allows us to follow the progress of the valve manufacturing digitally. Moreover, the TRC has a barcode which can be scanned at the assembly station to not only retrieve assembly and testing procedures that guide the assembly and testing technicians in doing their work, but also to notify them about any special requirements specific to that customer.

Experience the Future

Customers' response to digital products and solutions have been encouraging, and we are excited about the rapid progress being made in the domain. We welcome all to join us and experience the future of valves. ■

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