ARTICLE

TESA GROUP
SHOWS THE WAY TOWARDS THE DIGITAL FACTORY


Joël L'Her, Chief Operating Officer of the TESA Group

Joël L'Her, Chief Operating Officer of the TESA Group, smiles as he points to the tabulation on the terminal in his office. "This is last night's plant efficiency analysis. We have achieved our objective of a paperless factory."

While the TESA Group has its main manufacturing operation in Renens, Switzerland, it produces a range of measuring instruments in JMTC, its subsidiary in Jingjiang, China. Parts are also sourced from other world class companies with just-in-time delivery schedules. A system had to be developed to monitor the productivity and quality performance of these units.

L'Her's team has been working for years to develop a supervisory system that feeds all production and quality data into a database that anybody can access. This is vital for an company manufacturing parts for more than two thousand finished products in several production sites. The central database in Renens now provides the information needed to coordinate planning, monitor productivity and record quality performance for all manufacturing sites.

People accessing the database from their terminals get up-to-date information tailored for their needs. There is a constant flow of manufacturing and quality data from the shop floor being processed by different software packages prior to being stored in the database. A Manufacturing Execution System (MES) supervises the seamless integration of the different hardware and software components to provide the required information to users on their terminals.

On-line Production Order

It is 7 a.m. in Renens when Vincent Melcarne starts his morning shift. He switches on the terminal next to his turning centre. It lights up to display the drawing of a TESA-STAR probe part that Baptiste Ledesert, the planning manager, has scheduled for production. Vincent selects the part program for machining the part from a list on his machine panel, loads an aluminium blank in the chuck and starts the machining cycle.

Vincent then touches a button on the tactile screen of his terminal to signal that the production of the batch has started. As soon as the first part has been turned, Vincent measures it with the TESA TWIN-Cal digital caliper placed on his table. Like most of the electronic hand tools in the workshop, it is connected to the plant's wireless network.

Vincent's digital caliper has a TWIN wireless connection permitting bi-directional communication with the manufacturing system. The display shows a prompt instruction. Vincent measures the specified diameter and presses the data button to transmit the measured value to the system.
He measures every tenth part until he finishes machining the batch.

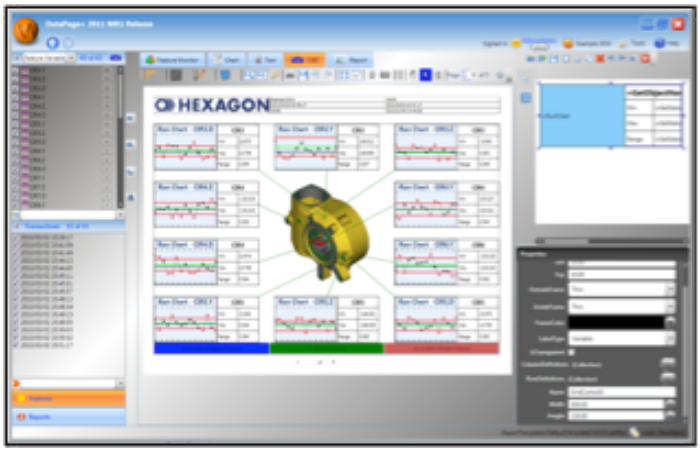
As soon as the batch is terminated, Vincent reports this by touching another button on the tactile screen of his terminal.
On his screen, Baptiste notes with satisfaction that the first operation for the TESA-STAR part has been completed and releases a production order for the next operation on a grinding machine.
"I no longer have to print production orders and deliver them to various locations."
Several time zones away, it is almost closing time in the Jianjiang factory. Eric Voiblet, Production Director, is tracking the production of TESA-STAR probes in Renens. He needs a batch of probes for his next shipment of coordinate measuring machines to Chinese customers. People in the Jianjiang can see what is happening in Renens and vice-verse. This provides for better inter-plant coordination.

Data Acquisition and Processing

While Vincent was measuring his parts, the measured values were being acquired over wireless by DataGage Plus, a data acquisition software package, which then stores this data in the central database.

DataGage Plus has many capabilities. It can acquire measured values from any type of hand tool, manual gauge or even coordinate measuring machines. It can also create a measurement part program for operator execution on the shop floor.
Within the plant, there are men and machines constantly transmitting measurement data.

In Receiving Inspection, a roving inspector is measuring batches with part number prompts on the display of his digital micrometer. In the machine shop, the coordinate measuring machine operator is inspecting a part by following instructions on a spreadsheet created by DataGage Plus.



"This ability to visualise measuring results provides a powerful tool for people at all levels from the workshop operator to the corporate quality assurance manager to ensure that manufacturing and quality processes remain on track," says Patrice Caumette, Quality Manager. The installed DataPage Plus software package processes the measured values for SPC (statistical process control).
The result can be displayed in the form of a graphical chart as well as a 'process capability value'. Such information enables production and quality personnel to determine whether the machine process is stable and that the measured values are within the control limits set for that particular diameter. This immediate feedback is useful for detecting potential problems and taking preventive action.

DataPage Plus can also work with another measurement software package, PC-DMIS (Dimensional Measuring Interface Standard), which is capable of translating different dimensional data inputs into a standard format. This enables the system to report measuring results from several measuring devices for a single part.

Despite this continual flow of digital bits from measuring instruments and machines, the network and software are able to identify each instrument source on the shop floor and store the data correctly in the central database.

Now that Vincent has signalled that the turning operation on his batch has been completed, it is time for a quality check.

Connectivity in the Digital Factory

In this concept of a global digital factory, connectivity plays a key role in collecting manufacturing and inspection data on a real time basis.

Achieving connectivity on a global basis is a gigantic task. It reaches down to every location in a factory: the roving inspector in receiving inspection, the operator on the machine or the inspector in the metrology laboratory. Every measuring device whether it be a digital caliper, a digital micrometer or a coordinate measuring machine has to be fitted with a RS232, USB or wireless connection. In this connection, TESA has had the opportunity of testing the reliability of its own hand tools and measuring equipment in setting up this global manufacturing execution system to link its manufacturing sites.
It was a thorough field test.“Thanks to our in-house connectivity capabilities as well as powerful software packages such as DataPage Plus, the TESA Group has been able to collect all vital production data in a common server database in a single location,” says Hai Thanh Nguyen, Project Manager for implementing the MES system. “We now have the means to increase our productivity on a continual basis.”

Now we know why L’Her has that satisfied look.