

## OEE and Acquisition Standards

I've taken a few trips to Germany recently to attend some workshops on an emerging Standard Methodology related to data capture from Programmable Logic Controllers (or PLCs)...

### PLC Data Capture

I'm always beguiled by new technology; on one of my trips to Dusseldorf I was excited to be able to use the mobile phone boarding card at the gate. It just shows how things have progressed in this sector, from waiting for the travel agent to post the 6-page ticket pack, to a paperless system and a 2D barcode image. There is a lot of negative feedback on the forums saying the paperless system fails to work on the iPad - too big to fit under the scanner apparently - but it works at both Heathrow and Düsseldorf. What a perfect use of technology; check in, flight status, and boarding card accomplished - all before you leave the hotel (or in my case, before getting out of bed).

Admittedly, technology change relating to PLC data capture has not been quite so dramatic (and some may argue less exciting) - but there is at least one that intends to make data capture much easier, and this, for me at least, is something to be excited about. When implementing an OEE System in a new plant, acquiring the data that is used to calculate OEE is almost always the most complicated part of the process. This often means that factories chose to capture data manually, or semi-automatically, and this can have a real impact on the overall success of their loss management strategies. Even at the most sophisticated plants, the subject of 'Automatic Data Capture' invariably produces a groan from site staff – as acquiring any data (such as a product count for an ERP System for example) has traditionally proved both complex and costly.

This is because, up until recently there has only been one way to access data from a PLC, and that was to have Drivers written for that specific PLC family. So data capture companies had to obtain, or write, different Drivers for Allen Bradley, Omron, Mitsubishi and Siemens etc. Whilst some sites have been able to standardise on a single PLC family per plant, others have not and it is common to have 4 or 5 PLC types on a single plant, all with their own operating modes – and their own specific Drivers. The time and cost implications for rolling out automatic data capture across these sites are clear.

### 'The Weihenstephan Standard.'

To simplify this process, the Technical University of Munich began a research study to try and remove some of complexity by creating a Standard Methodology for machine manufacturers to provide equipment data to performance measurement systems such as OEE: 'The Weihenstephan Standard.'

The Standard began in the bottling industry; in fact Weihenstephan is a famous wheat beer made in the oldest brewery in the world (not the real purpose of my visits to Germany, but a welcome addition!).



The concept is simple; in order to claim the Weihenstephen Standard, the machine manufacturer must ensure that all equipment provides access to operational data in the same way, irrespective of the PLC used to operate that equipment. This would mean that when a new machine, with a completely different PLC family, replaces an old one, the data would be obtained in exactly the same standard way.

### **The Weihenstephen Standard comprises four parts:**

- Physical interface specifications
- Specification of interface content
- Data evaluation and reporting
- Approval and safe operation

The communication method is Transmission Control Protocol over Internet Protocol or TCP/IP, with each item of equipment being contactable via a unique IP address and port number.

Only a small number of commands are needed to acquire the data. One checks for signs of life, such as a machine healthy signal, whilst others read or write single values. Further commands can read or write lists of values as required.

At the core of the Standard are data tags that are used to define messages, including counters, failure notices, and expected operating states for production line equipment. For example tag number 50005 may refer to a 'total bottle count'. The Standard ensures that any OEE client (such as a Human Machine Interface or Touch Screen) can guarantee that the value of tag 50005 will always hold a count of the number of bottles at that moment in time.

All the configuration definitions are held in xml files and act as 'look-up' tables. Many of the tags are pre-defined, and the equipment manufacturer must use the obligatory ones in order to meet the Standard. The machine maker is also able to register and use it's own tags for specific machines. The OEE client just has to check the xml configuration file to see what each tag holds.

### **The Vision**

The Weihenstephen vision is that any OEE client can be 'aimed' at a completely different piece of equipment, which adheres to the Standard, and begin to acquire data - without modification. In fact the OEE software doesn't even need to know which PLC is used. This means significantly reduced data acquisition and configuration costs and accelerated set up times. It also ensures the integrity of the data you acquire, whereas if you were extracting the data from lots of machines, in lots of different ways, a validation exercise would be required. The Weihenstephen Standard ensures your data is consistently captured across your site, and throughout your group.

### **Evaluation and Reporting**

The third part of the Standard is 'data evaluation and reporting', and it's where the software supplier takes over with, for example, OEE analysis and reporting.

With a much simpler data acquisition layer we can concentrate on the real work of helping plants use their data to improve their performance.

### **Operator Knowledge**

Automatic Data Capture from PLCs is the final step in the data acquisition journey for many manufacturers – and this new Weihenstephen Standard could really assist in the roll out of software assisted performance improvement programmes. But it's worth remembering that data capture from PLCs should be used to support operators (by accurately and automatically capturing time losses for instance). PLCs data should never replace operator information.

For example, if a bottle sensor PLC code shows the filler stop is due to bottle absence, but it's actually because a guide keeps knocking bottles out of alignment – only the operator will be able to see and capture this detail. And the operator's 'eye for detail' is vital to enable your Continuous Improvement team to be able to understand and resolve the issue effectively.

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