



Managing your assets just got easier...

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Abstract

Anyone involved in the process industry will know that compiling and managing an asset register is always a major headache; what have you got, where is it, is it being maintained, does it comply with internal and industry regulations?

Over the past ten years a number of so called 'smart' asset management solutions, utilising Hart, FF and ProfiBUS communications protocols, have been released. However, while these systems are very effective for smart instruments (which still only comprises a small percentage of most process plants) they do not help an end user identify and manage the majority of the assets on their plant that are not smart enabled.

By utilising the latest RFID (Radio Frequency Identification), mobile computing and Web technologies organisations can now provide an effective way to manage all of their plant's valves. ATEX/UL certified mobile/handheld computers, with integrated RFID readers, can now deliver a complete set of tools for technicians and engineers out in the plant that eliminates paperwork, gives positive proof of identification, proves attendance and delivers 100% data validity by removing manual data entry.

Web based management tools mean that access is available remotely allowing engineers and managers to monitor their plants and make management decisions from anywhere in the world. Web based applications now mean that third parties, such as manufacturers, EPC's and MRO contractors can be granted access to update valve data, safety inspection history and transfer documentation online ensuring that the end user always has accurate, real time data.

Some users in the field are already using mobile solutions to record and monitor LDAR (fugitive emissions), SIL (partial stroke) testing and Locked valve status as well as perform process checks, drip audits and pre-shutdown audits which in turn generate works orders detailing corrective actions to be taken. The next key step is integrating this data within core systems as nobody wants yet another standalone application. Web based technology, open software standards and increasing collaboration with core providers such as Oracle and SAP now give the end user a seamless joined-up process.

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1. Some definitions and explanations

Radio frequency identification (**RFID**) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves. It's often called auto-identification.

Auto-ID technologies include bar codes, optical character readers and some biometric technologies, such as fingerprint scans. Auto-ID technologies have been used to reduce the amount of time and labour needed to input data manually and to improve data accuracy.

A typical RFID tag consists of a microchip attached to a radio antenna mounted within or on some form of housing (paper, plastic, metal, glass). These chips can store as much as 2 kilobytes of data. For example, information about a product or shipment—date of manufacture, safety tests, MTR's can be written to a tag. However, the development of web technology means that data about the asset is typically stored in a central web application and is assessable by authorized users. The unique serial number of the RFID tag is cross-referenced to a web database and stores the full DNA of the asset. No more pieces of paper and wasted time searching for pieces of paper!

To retrieve the data stored on an RFID tag, you need a reader. A typical reader is a device that has one or more antennas that emit radio waves and receive signals back from the tag. The reader then passes the information in digital form to a computer application.

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2. How do RFID tags work and are they suitable for Process industries?

Tags are available in all shapes and sizes and are well suited to the hazardous, rugged environments experienced by most Process companies, particularly in oil and gas. High and low temperature ATEX Zone 1 approved intrinsically-safe tags are available. This provides companies the flexibility to track their critical assets, knowing that safety has been properly considered and approved. Within the last 2 years, specially designed ceramic tags have been in use in extreme conditions tracking oil pipelines in Europe.

Tags are available in Low Frequency (LF), High Frequency (HF) and Ultra High Frequency (UHF) formats and are suitable for solving a variety of different problems, depending upon the business application:

LF – no power requirements, little data memory, proof of attendance, maintenance, inspection, field data collection (temperature, pressure), read range of 5-20cm

HF – some have battery power, increased data storage (2mb); difficult to reach locations, read range of 3 metres

UHF – no internal power required, read range of over 10 metres and best suited for warehouse and inventory management.



Intrinsically safe tie-on tags

An increasing number of users in the Oil and Gas sectors are replacing traditional barcodes with RFID to streamline their own production process and effectively track their own products.

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3. How can field engineers benefit from this technology?

Inspectors and plant managers are increasingly using mobile handheld technology to capture results in the field and integrating this data directly into their 'back-office' applications (e.g. SAP, Oracle, Maximo). The problem has always been recognising the asset which is often covered in debris and has probably been replaced or repaired without an audit history. This has a serious knock-on impact to many departments which in turn affect the field engineer directly:

- **Purchasing departments:** trying to order replacements parts in whole or in part is time consuming as locating manufacturers and part numbers can often be a manual paper exercise;
- **Accounting departments:** calculating total cost of ownership and trend analysis of critical assets often have to resort to 'guess work';
- **Health and Safety:** ensuring the correct safety procedures are followed by trained personnel on the correct asset (safety relief valves, flame arrestors, tank farms) across vast plants/refineries can be difficult to manage.

The development of easy to use rugged handheld computers which are ATEX Zone 1 approved ensures that critical data is captured automatically and without human intervention when coupled with RFID tagged assets and reduces the time to fix problems; leaking valves can be identified immediately and re-packed or replaced with the relevant data available instantly.



Capturing temperature and inspection readings

Finally, the integration of field data with core business applications completes the loop for many organisations that wish to seamlessly manage and maximise their electronic information. Obviously this ensures that data is only collected in one place, removes unnecessary re-keying and quickly gives the field engineer access to important statistical and historical information.

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4. The valve supply chain

One of the most easily recognisable features of tagging and tracking assets are the benefits it gives to a typical supply chain:

Valves

Manufacturer - tags all valves and uploads MTR's, other certificates to a web application



Distributor – reads tags on delivery and automatically updates inventory systems



Specialist contractor (e.g. fabrication, actuation) – access to full history or DNA of the valve and updates relevant modifications section



End-User: main Goods-in, Refinery, Plant – reads tags on delivery and automatically sends to nominated location/person, full access to history of valve and ability to track throughout the above process, inspectors can instantly read tag and interrogate maintenance records



5. Conclusion

Technology to manage assets just got easier...