



Compressors and Industry 4.0

In industry compressors are ubiquitous. They provide compressed air in factories to power equipment and tools, they transport gas along pipelines and they are used in petroleum refining operations.

Compressors are mechanical devices that increase the pressure of a gas by reducing its volume and to do this they require a source of energy, usually electrical. Over 10% of electricity supplied to industry is used to compress air.

Being a mechanical device, compressor components degrade with use and may eventually fail. Failure can be costly in terms of loss of service and cost of repair.

Minimising the energy consumption of compressor installations and detecting deterioration in performance and condition is thus an issue for industry.

So how can Industry 4.0 help?

Whilst compressor installations invariably have associated control systems these are often limited in their sophistication and frequently standalone in their operation (i.e. Industry 3.0).

Compressor manufacturers and others offer real-time, remote monitoring and optimisation services aimed at improving operational performance and detecting deterioration that could lead to failure.

Whilst this is obviously a transition towards Industry 4.0 it is still really only the first step.

When remote, cyber-physical systems are able to make changes to compressor control systems directly, based upon advanced control algorithms and data received from a network of sensors, Industry 4.0 will be a reality.

When operational and maintenance personnel are notified, via their smartphone, when condition monitoring alert thresholds are about to be exceeded and along with that notification, technical assistance in how to resolve the issue is provided, Industry 4.0 will be well established.

An Industry 4.0 solution

Our client, a global manufacturing company, operates a fleet of air compressors that consume a large proportion of the electricity they buy each year. Whilst they knew how much energy their compressors used they had little understanding of the specific energy performance of their compressor installations in terms of kWh per kg of compressed air generated.

Whilst their compressor installations were a key part of their operations they also had very little indication of the mechanical condition of individual compressors.

Our solution required the installation of a network of flowmeters to measure the amount of compressed air generated, its flow rates and pressure, along with electricity consumption data from networked kWh meters. Further sensors would provide measurements of barometric pressure, ambient temperature, humidity and vibration levels and other relevant data would be extracted from the compressor control system.

This real-time data would be processed via advanced control algorithms and used to inform operations and maintenance staff directly but importantly, only when their attention was required. These alerts would be accompanied with technical assistance on the action to be taken to improve operational performance and to avoid downtime due to machine failure.

Whilst a phased approach to implementation is underway, with the first phase focused on the installation of mass flow meters, it is estimated that payback will be achieved in less than 12 months.

Phase 1

Compressed Air System
Energy Performance

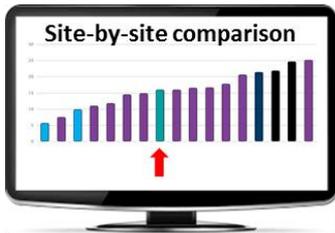


Operations

Awareness of Under Performance with Advice



Maintenance



Corporate Sustainability

Monitor | Alert | Advise | Compare