Lean Manufacturing
via
Real-Time Information Management

Eliminate Risk
Improve Efficiency
Reduce Cost
Harford Control has been providing continuous service and support to FMCG industries in Europe for more than 4 decades.

In the late 1970s, we initially developed one of the first computerised weight control systems to meet the needs of European Average Quantity Law, which also took into account statistical process control and process capability, to both satisfy legal compliance and minimise giveaway, with fewer process adjustments.

Now, we provide a suite of modular software products for any manufacturing application, developed through client demand, user feedback and continuous improvement. Solutions range from entry level weight control / paperless quality management systems to automated date coding systems with packaging and label verification to complete MES / MIS systems, fully integrated with your production line equipment and existing business systems.

Our valued clients range from Scotland’s smallest Whisky distillery to world class global companies like Diageo, Unilever, Beam Suntory and Muller Dairies.

**About Harford Control**

Most manufacturers find themselves facing increasingly competitive conditions, with continually rising prices for raw materials, labour and energy at one end, and customers demanding consistently high quality at lowest cost at the other.

The proven viable route to sustain competitive advantage, without compromising quality standards, is to focus inwardly on the reduction of operating costs and wastage. Whilst some gains can be achieved with investment in new equipment to increase capacity, as well as the introduction of ERP systems to integrate business processes, many more benefits lie in the creation of a real-time connection between shop floor and top floor. Real performance improvement and lasting change need to be driven by a fully integrated information management system which collects all aspects of factory floor data within a single solution, requiring the minimum of operator input.

Real-time information dramatically increases visibility throughout the business, to help all personnel to drive sustained performance improvement, minimise wastage and reduce operating costs.
Ease of use is a major factor in any successful system implementation. At Harford we focus primarily on the user, to ensure an intuitive, easy to navigate solution that users will want to use - whilst increasing accuracy of data and operational discipline. Whether it is an operator entering data on the factory floor, an engineer looking at performance trends, or a manager looking at real-time reports, the whole team will experience the benefits of moving away from paper in favour of a real-time automated solution.

**TURN COMPLEXITY INTO SIMPLICITY**

**ELIMINATE RISK**
Human error cannot always be avoided, but through automation we can minimise the risk of it occurring. Harford configures individual machines or whole production lines with minimal operator input, ensuring correct materials supply and instant verification of manually entered data.

**IMPROVE EFFICIENCY**
Accurate, prioritised and standardised information is key to driving real-time informed decision-making. This information must be highly visual and easy to understand, to increase workforce engagement, motivation, and the response time to unexpected events and improvement opportunities.

**REDUCE COST**
Minimising expenditure is often a top priority, immediately after satisfying customers with consistently high quality products. Only when processes are controlled effectively can valuable capital gains be achieved. Our purpose is to support you to minimise wastage of materials and labour so as to increase production efficiency and reduce the cost of manufacturing.
There are countless reasons for things to go wrong, especially in a fast-paced manufacturing environment. Using the wrong ingredient, applying an incorrect label, mixing up components, or selecting an inappropriate machine setting are just a few of the mistakes frequently made by operators, which lead to rework, batch rejections and customer dissatisfaction. We have found that there are three key reasons for human error. Fortunately, our automation and applied operational disciplines play a major part in eliminating such errors.

**EFFECTIVE RISK MANAGEMENT**

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“*Effective* Quality Management is a systematic way of guaranteeing that organized activities happen the way they are planned.”

*Philip B. Crosby, Quality is Free*
The best way to avoid mistakes is to remove human error wherever possible. We strongly believe in the benefits of bi-directional communication with in-line machinery, allowing us to automatically configure any connected device in a production line or process with the appropriate settings and to capture results the same way. These links are established via common or uniquely developed interfaces, OPC, etc.-most frequently with date/batch code printers, checkweighers, metal detectors, fillers, in-line barcode scanners, on-line machine vision, and more.

However, not all process actions can be automated. Automation to prevent human error is preferred, wherever possible, but some operator intervention is inevitable in most processes. Where intervention is necessary, we attempt to regiment such actions by providing guidance within a disciplined, structured framework, thus ensuring that the risk of operator error is reduced to the absolute minimum.

Removing paper from the shopfloor and replacing it with clear and concise on-screen instructions is a key step to preventing mistakes and to achieving Right First Time quality. Checks critical to the operation are indicated visually and audibly at set intervals; failure to perform these checks can result in the line being stopped until supervisory intervention is provided. All results are instantly verified; corrective action advice is displayed as necessary and results are instantly available to decision-makers.

“It is always cheaper to do the job right the first time”

Philip B. Crosby, Quality Is Free

PACKAGING VERIFICATION

Manual confirmation of packaging components bears a lot of risk. As part of a typical solution, we install in-line barcode readers to verify each packaging component using various identifiers, including traditional retail barcodes and 2D Datamatrix codes. This way, 100% of packs can be inspected and each component is matched and verified against the product specification. If an incorrect code is detected, an immediate line stop is triggered, then investigation and rectification of the issue is required before a line re-start.

NO MORE PRODUCT RECALLS

Product recalls, withdrawals or returns are often caused by labelling and packaging errors, which, in the worst case, can cause fatalities due to incorrect allergen information. Next to the cost of rectification and associated fines, a recall mainly impacts upon the reputation of a business and may diminish customer confidence in a brand or product. Very often, genuine mistakes made by operators are not caught early enough, allowing non-conforming product to leave a manufacturer’s premises and reach the customer. Even where such mistakes are picked up before dispatch, expensive rework and product wastage becomes inevitable.

By automating production line setup, including the configuration of packaging line devices, such as printers, scanners, metal detectors, checkweighers, filling and sealing machines, we minimise the risk of operator error and ensure that products are packed and labelled correctly. As a positive side effect, changeover times can be reduced significantly.
Quick and focused reviews of performance data in real-time enable mid-course corrections and immediate small-scale fixes that collectively result in significant improvements in overall effectiveness. Displayed on mobile, small and large screens, SIC is one of many tools in the Harford toolkit aimed at increasing visibility of information to drive performance improvement.

OVERALL EQUIPMENT EFFECTIVENESS (OEE)
Albeit very common, OEE is only one composite metric for manufacturing performance, and is by no means a panacea as it doesn’t include vitally important metrics, such as labour or materials utilisation, both of which are essential to establishing a true reflection of overall production effectiveness. OEE however, when used as a true reflection of quality production output, can be a great teamwork enabler, encouraging production, technical, quality, engineering, logistics, procurement and new product development departments to communicate better and work more closely towards agreed improvement objectives.

GUIDED BY LEAN PRINCIPLES
In keeping with Lean Six Sigma methodology, we aim to support the collaborative team effort to improve performance by systematically removing waste and reducing variation, whilst consistently meeting high quality standards with optimal efficiency. Apart from the design, supply and support of a well-engineered and integrated system, Harford has the in-house capability to support their clients’ visions and improvement objectives through in-depth knowledge of performance improvement principles, tools and techniques such as Value Stream Mapping, Six Sigma, Cp/Cpk studies, Kaizen, DMAIC and much more. All our business improvement specialists/consultants are accredited Lean Six Sigma Black Belts.

A system is a network of interdependent components that work together to try to accomplish the aim of the system. A system must have an aim. Without the aim, there is no system.

W. Edwards Deming
INTRODUCE BETTER CONTROL
Replacing paperwork with on-screen interactions helps to systematically guide operators through critical quality assurance checks with instant and appropriate input verification and corrective action advice, as required.

REDUCE VARIATION WITH SPC
Statistical Process Control helps to reduce rejects and rework, minimise process adjustment, maximize productivity, improve resource utilization, increase operational efficiency, and much more.

FREE UP MANAGERIAL TIME
Automatic analysis, prioritisation and distribution of information in real-time allows decision-makers to focus on performance improvement, rather than doing clerical work.

COST REDUCTION
In any manufacturing process, only two variables can be affected through increased control and improvements: raw materials (including energy usage) and labour utilisation.

MATERIALS UTILISATION
Next to the instability of commodity prices, materials wastage, in its many shapes and forms, is a main contributor to excessive production costs. Our aim is to reduce overall wastage in manufacturing and in the supply chain. Harford’s unique weight control solution combines Statistical Process Control with a process capability algorithm to effectively minimise unnecessary wastage in filling processes. Rejects and rework are reduced by applying Right First Time principles to quality assurance checks, whereas the use of incorrect ingredients and components is prevented by tracking materials from Goods In to Despatch.

LABOUR UTILISATION
OEE is often used as the universal measure of conversion effectiveness. As useful as this is, it is only part of the story! It assumes that manning levels are constant and does not really concern itself with production wastage, such as overfill. Overfill is dealt with through materials utilisation, as above, but manning levels are not. Quite frequently, the manning levels on a line will change due to sickness, production line issues or short-term demand. This is where some of the metrics like units per man hour and kilos / litres per man hour become more relevant. Within our reporting suite, a multitude of options are available to choose how you want to report and correlate your production figures - as simple as OEE or production efficiency, or combining multiple measures into a more comprehensive view of your performance.
Our Weight/Volume Control programme has constantly been developed and improved upon since 1979 and still remains the market leader in terms of overfill reduction and legal compliance. We took and sustained a different approach to all our competitors, in that we combined the benefits of Average Quantity Law with Statistical Process Control (SPC) and Process Capability (Cp / Cpk), ensuring that optimum control can be achieved, even where high levels of variation exist in packing / bottling operations.

When implemented correctly, Average Quantity Law is one of the few pieces of legislation that offers huge potential opportunities for FMCG packers to reduce costs. Automating the calculation of process variables and giving concise instructions to the operator is a big step, but a very important one to achieve minimal giveaway.

Many sites using the Harford solution proudly boast of overfill levels as low as 0.1% (1ml per litre / 1g per kg) - which they achieve by doing fewer process adjustments! Any legal non-conformances are instantly flagged up for action, while all results and actions are fully traceable for audits and trend analyses.

Encirc Beverages is a market leader in glass container design, manufacturing, bottling and logistics solutions for the UK and Irish food & beverage industries. One of their prime objectives was to reduce the level of giveaway by automating weight control, replacing their outdated weight monitoring system.

They also wanted to:
- Reduce or eliminate factory paperwork for quality checks
- Obtain real-time, integrated management information
- Collect and collate information from legacy systems (e.g. Krones LDS, Mecmesin torque meters)
- Perform more efficient trend analyses on information from their laboratory equipment such as Anton Paar Alcoholiser, Hach CO2/O2 Analyser, Foss analytical equipment, etc.
- Improve overall visibility to ultimately improve efficiency

The Harford weight control module has enabled Encirc to reduce their overfill to hitherto unobtainable levels, reducing giveaway to a minimum, whilst keeping them fully legally compliant. The introduction of HMIs on the production line, together with computer tablets to collect data from other parts of each line and carry out roving quality audits, has allowed paperwork to be virtually eliminated from the factory floor.

RESULTS
Encirc’s management team now benefit from real-time information on their desktops, tablets, and phones, giving them an instant snapshot of the state of production and immediate access to improvement options, to further increase and sustain their efficiencies.

One of the best things about dealing with Harford is, as well as their team being professional, knowledgeable and helpful, they are all really, really nice people.

Martin Goerner, Laboratory Manager

WEIGHT CONTROL

We are already seeing noticeable improvements in process control and wastage – it seems so user friendly even I could use it!

Operations Director, Edrington Group
Traditionally, essential data in manufacturing operations is spread across paper, spreadsheets, databases and various computer systems. This insular approach works until a point is reached where the business requires more integrated, consistent and accessible data. Combining automated and legacy systems with process control into a single solution makes real-time information available in easily understandable, highly visual formats. This way, operators and management can react instantly to unexpected events, and use standardised reporting, even across sites, to access trend analyses and historic information to become more proactive in their drive for continued performance improvement.

**Emmett UK**, a fresh produce business supplying major retailers, was looking to replace their existing production control, printing and coding solution with an integrated solution that had to meet a number of important requirements:

- Eliminate process re-work and withdrawals by eliminating packing errors
- Improve processing operational efficiency through use of technology
- A printing/coding system that caters for all production lines
- Improved access to process data and improved reporting
- System stability with no unplanned downtime
- A 24/7 supported software solution, scalable with business growth

**SOLUTION**

Working closely with the team at Emmett, Harford implemented a solution that met all of the requirements and more. Tracking all materials from Goods In to Despatch within the system ensures that only accurate origin information is printed onto the correct retail packaging, eliminating any coding and labelling issues and guaranteeing full compliance with any retailer’s requirements. Tray end label printers are controlled by Harford directly on the line, making the print room redundant. Paperless checks recorded on Harford terminals, in all relevant areas of production, keep the technical team informed about product quality. Large screens keep all personnel informed about performance, yield and plan conformance - in real-time.

**RESULTS**

Minimising the use of paper on the shop floor, introducing further automation and removing the print room enabled better control of the increasing complexity in a rapidly growing business.

**CASE 2 Food Manufacturing**

Having installed the Harford system across all our packing lines, I am very happy with our improvement to date. It has helped us to minimise production risk, improve quality consistency and improve efficiency, whilst eliminating most factory floor paperwork and providing instant traceability.

Richard Fox, Operations Director

**FULL FACTORY AUTOMATION**

To achieve full integration, we have a dedicated team continually working on the creation and implementation of links with all types of packaging line equipment as well as other business systems. We have an extensive list of available interfaces, ranging from simple weighing or inspection equipment (off-line and in-line), to SCADA systems for automated process control, to ERP links for aligning schedules and validating expected materials.
UNIQUE HARDWARE FOR UNIQUE SOLUTIONS

Simplified data capture is key to providing operational teams in fast-moving production environments with up-to-date, accurate information to make the right decisions at the right time. Where required, we provide bespoke user interfaces with unique benefits.

TOUCHSCREEN TERMINALS
Our operator terminals (HMIs) are designed to be simple, versatile and robust, in any environment. Food-grade stainless steel, IP67-rated opto-isolated connectors, and an uninterruptible power supply are just a few of the many reliability-focused benefits. A multitude of peripherals can be connected and powered at the same time, e.g. cameras, height gauges, digital callipers, torque testers, pH-meters, alcolyzers, O2/CO2 meters, etc.

MOBILE UNITS
Our apps for tablets and mobiles allow data capture on the go, wherever you are, without the need for a continuous WiFi connection. A live factory status app is available for both Android and iOS, to keep you updated across the globe. Our Mobile Manager enables swift recording of any types of incidents, as well as the instant review of any non-conformances.

SYSTEM ARCHITECTURE

[Diagram showing system architecture]

- Simplified data capture is key to providing operational teams in fast-moving production environments with up-to-date, accurate information to make the right decisions at the right time.
- Touchscreen terminals are designed to be simple, versatile, and robust in any environment.
- Mobile units allow data capture on the go without the need for a continuous WiFi connection.
- The system architecture integrates various components such as ERP, data collection, and live reporting.

[Diagram details:
- Intuitive interface with clear and easily understandable instructions
- Designed with durability in mind, using only waterproof components
- Integrated camera for photographic traceability
- Direct integration of peripherals, powered by a single filtered source
- Audible and visual test due notifications and warnings
- Military grade fully waterproof connectors]
ANY INDUSTRY, ANY PROCESS

Irrespective of the type of business, whether dairy, spirit bottling, fresh fish packing, ready meals etc., all are faced with similar problems. Though every business is totally different, in its type of product, portfolio of variables, production lines and its end users, each manufacturer, amongst all this complexity, is really concerned with only two things; optimisation of raw materials usage and labour utilisation. Our primary focus is to help you achieve and sustain your business goals!

Below is an excerpt of some of the industries and manufacturing processes that already benefit from a Harford solution.

BEVERAGES

FOOD

PRODUCE

HEALTH & BEAUTY

GET IN TOUCH

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