Automation India

Enabling Global Competitiveness

Issue 2 – November, 2004 A newsletter of the Automation Industry Association

Dear Friends,

In June this year, we announced the formation of the Automation Industry Association (AIA). In keeping with AIA's primary mission of increasing knowledge & awareness levels and helping Indian industry leverage cutting-edge automation technologies for global competitiveness, we have taken our first major step, by organising ***Automation Tech 2004.*** *The theme for the symposium is* "Integrated Industrial Automation Technologies for Global Competitiveness*". Mr. Kapil Sibal, Minister for Science and Technology, will set the stage as the keynote speaker. This is an event with a difference as the eminent speakers at the forum represent a range of 'key user industries' across sectors including power, petroleum, refining, metals, paper, food & life sciences. These industry icons will share their experiences of how automation technologies are playing a key role in their premier organisations and elaborate on their vision for the future. Leading global consultants will present market perspectives and technology insights from a global and Indian viewpoint.*

This event provides a common cross-industry platform, where around 300 invited delegates, representing the Indian industry, key academicians, media and others have the opportunity to share information and knowledge related to the deployment and development of automation technologies, as well as the latest trends and global best practices across the industry spectrum.

This is indeed an important step in AIA's journey and we remain committed to continue on our mission and organise similar programmes and initiatives as we move ahead. We look forward to the ongoing support and cooperation of all stakeholders in pursuing this common cause.

Ravi Uppal
Honorary President, AIA

A symposium on Integrated Industrial Automation for Global Competitiveness

- Mr. Kapil Sibal
  Minister for Science & Technology, Government of India
- Mr. Andy Chatha
  President, ARC Advisory Group (Boston, USA)
- Dr. J J Irani
  Director, Tata Sons Ltd.
- Mr. H S Kohli
  Executive Director, Reliance Industries Ltd.
- Mr. A M Uplenchwar
  Director (Pipelines), Indian Oil Corporation Ltd.
- Dr. S Rama Iyer
  Chairman & Managing Director, Kvaerner Powergas India
- Mr. T Shankaralingam
  Director – Projects, National Thermal Power Corporation
- Mr. Pradeep Dhobale
  Chief Executive, ITC Ltd., Paperboards and Specialty Papers Division
- Dr. Arun Chandavarkar
  President – Operations & Technology, Biocon Ltd.
- Mr. Rakesh Verma
  Chief Engineer – South Asia Region, Nestle India Ltd.
- Mr. Sanjay Jain
  Country Managing Director, Accenture Ltd.

Message from

Kapil Sibal

Minister for Science & Technology, Government of India

India is on the move! With a GDP growth of around 7%, we have one of the fastest growing economies in the world and India is steadily on the path of global integration. Amongst other leading indicators we are witnessing growth in foreign trade, rising domestic consumer demand, infrastructure growth, industrial revival, capacity expansion and a significant pick-up in manufacturing output and capital goods sector. One of the most promising signs is that the Indian industry is now 'thinking big' and nurturing global aspirations, by becoming global outsourcing hubs and also setting up overseas operations.

Realisation is fast setting in that India's future cannot depend simply on being the 'back office' of the world. The IT and BPO revolution as well as the evolution of emergence sectors like biotechnology certainly have a role to play in contributing to India's globalisation, but one of the biggest potential areas of 'sustainable advantage' is for us to position India as a global 'manufacturing hub' and 'R&D / Engineering base'. All successful nations around the world have developed on the basis of a strong industrial sector. Moreover manufacturing has a multiplier effect in terms of derived demand, employment, ancillaries etc.

In order to compete effectively on a global scale, Indian manufacturing will have to rise to the challenge by addressing issues like productivity, efficiency, cost competitiveness, quality, consistency, aesthetics and production methods. Automation has a key role to play in facilitating this quest for being truly world-class and ensuring a 'competitive advantage' for the Indian industry.

From a historical perspective, automation in India has long been seen more as a shop floor tool than a 'business performance enabler'. Even where industrial automation has been adopted the technology threshold is fairly low when compared to world standards. Moreover, there are many sectoral disparities and significant variations in terms of complexity when it comes to adoption of automation technologies. Lack of knowledge and awareness has been a limiting factor despite the fact that all the major automation technology providers in the world have an extensive presence in India.

While Indian industry has accepted and is adopting enterprise solutions for business processes, it is yet to recognise the full potential of manufacturing automation and 'collaborative systems'. Automation has been restricted mainly to the technical domain and not been sufficiently seen in terms of its 'business value'. While many companies have adopted ERP or MRP2 for business processes they still have little or no basic plant automation to talk up to enterprise level. As an indicator, the total automation market in China, a country that we benchmark in terms of economic growth, is nearly 8 to 10 times larger than in India !

In many ways, we have been prisoners of our own minds and slow to adapt to the challenges of the 'new world order'. For instance, the mindset that 'lowest price' is an end in itself, regardless of quality, aesthetics, efficiency and other parameters and the belief that low labour costs are the key to ensuring this advantage. Others have propagated the misnomer that automation directly competes with labour as a factor of production. Automation is not about replacing humans, but about complementing human skills and efforts in a balanced manner. It's about facilitating processes, enabling measurement & control, ensuring optimum efficiency, increasing productivity, maintaining consistency and quality etc.

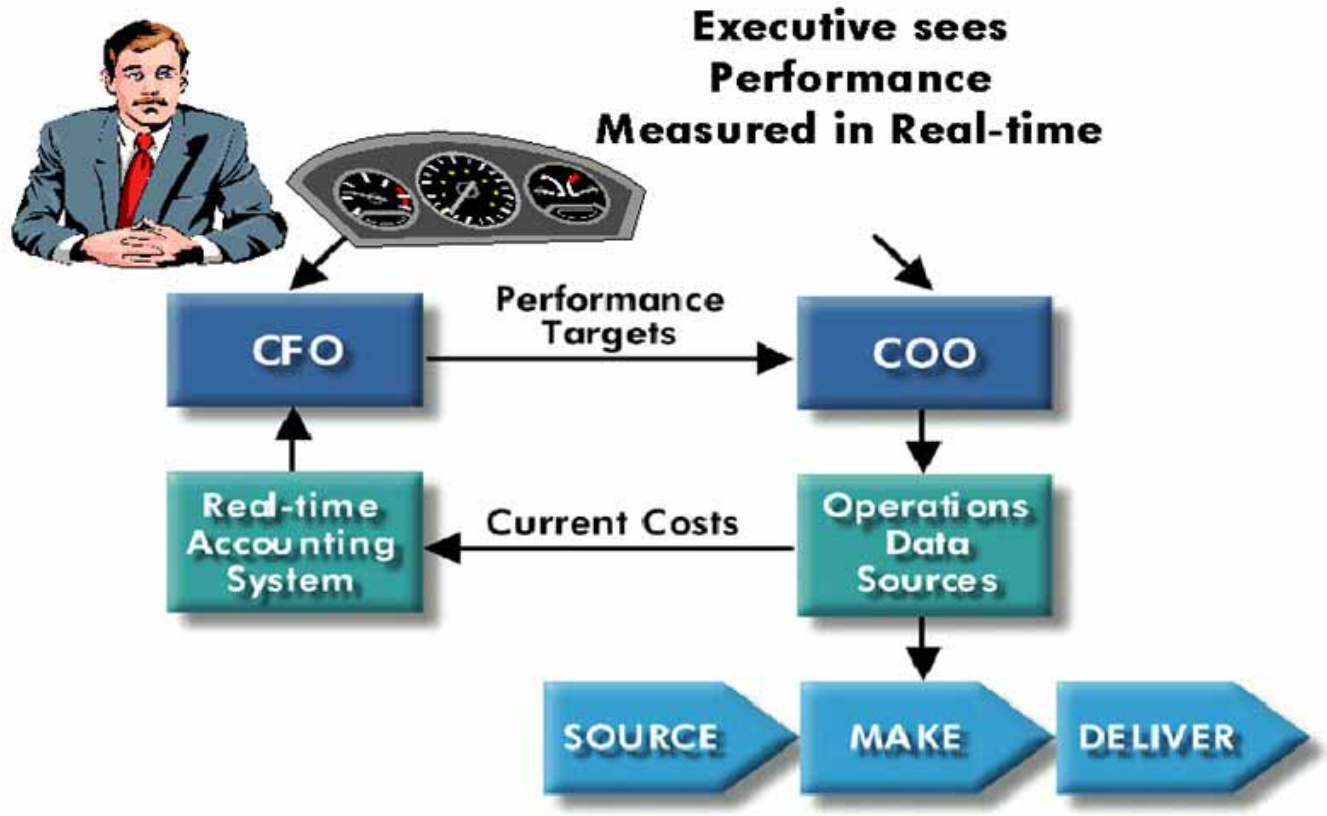
India's economic growth can gather momentum in a sustained manner only when the industrial sector grows alongside agriculture. To achieve the consistent 8-10% GDP growth targets we aspire towards, industry will need to grow at decent double digit levels, increasing their domestic and export contribution significantly. The manufacturing sector has a key role to play here and its progress is closely linked with the adoption of state-of-the-art automation technologies. Regardless of sector, we have a tremendous opportunity to position the Indian industry on the world map.

I was indeed pleased to hear of the formation of the Automation Industry Association (AIA) under the aegis of the leading global automation providers and am delighted that AIA has taken up the worthy cause of 'enabling global competitiveness' of Indian industry. Knowledge sharing and awareness creation across stakeholders is a key element in such endeavours and Automation Tech 2004 is an important step in this direction. I wish AIA and the event every success and ongoing support and encouragement in furthering their noble cause.

Real-time Performance Management Systems

Help Manufacturers Achieve Operational Excellence

Automation provides real-time information to decision-makers about the health, efficiency, and effectiveness of all shop floor operations, where true value creation takes place. Economic decision-makers looking for key performance indicators (KPIs), require a dashboard to monitor, manage and control production and enterprise operations. Automation Systems are at the core of Real-time Management Systems. They, acting as the dashboard, help manufacturing companies to respond to the market needs most efficiently and effectively.

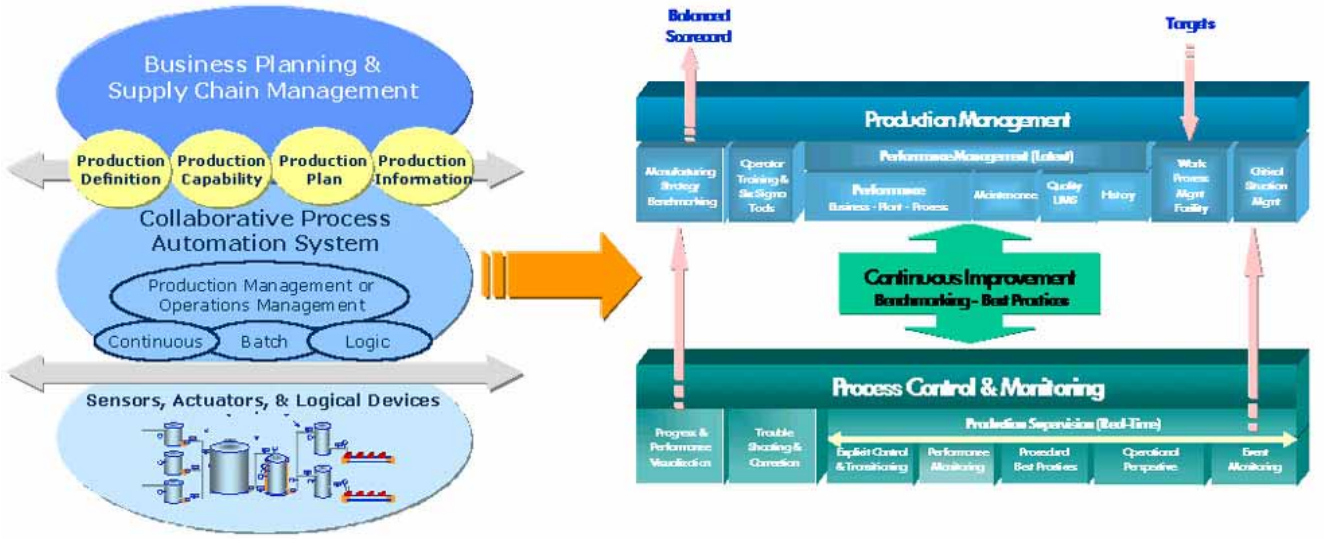


Automation is the epicentre of Real-time Performance Management Systems

Tracking and improving the plant and enterprise productivity and performance through Real-time Performance Management (RPM) are the key ingredients in making production and enterprise operations market responsive most optimally.

The foundation of RPM is the integration of real-time manufacturing data with real-time cost data for achieving operational excellence (OpX). Industry executives need to know how much money their company spent or earned on a real-time basis. The automation principle 'if you can't measure it, you can't control it' holds true. Real-time data, relating to the manufacturing process and emanating from the plant floor, that is integrated with the enterprise data would reveal the real-time economic performance and the true plant production potential.

Ready access to real-time data, when it is needed, where it is needed, in a form that is needed, and from any point in the system, ensures 'Data Synchronisation', which is an essential ingredient of any RPM implementation. Automation systems with pervasive computing capabilities, intelligent devices with communication capabilities, and high performance processing including asset management functionalities, enable Data Synchronisation and OpX to be achieved. As RPM initiatives take hold, intelligent and bus-enabled communicating devices will be more widely used along with control systems, which are standards based and built ground up.



The Collaborative Process Automation System Structure

Business Performance Improvement through Operational Excellence

ARC's business-performance improvement concept is Operational Excellence (OpX). The OpX concept is valuable for conveying a clear and intuitive understanding of the business improvement processes. Operational Excellence in a process plant environment translates to Production Management and Process Control.

OpX embraces two fundamental processes – Improvement and Control. Improvement is an offline process that utilises tools such as Six Sigma to identify weaknesses compromising performance. The second process, Control, essentially is the control strategy and execution for the plant and is the heart of OpX. Control also has two levels, a supervisory level and an execution level. These levels, in terms of their automation counterparts, are production management and process control respectively. OpX is achieved through Collaborative Process Automation System (CPAS) model, which is a scalable, high availability platform that facilitates a robust, data rich and unbounded environment for control of the process.

OpX in Production Management

Within the CPAS model, Performance Management is the heart of Production Management. Here, the guiding principle is optimal performance.

OpX in Process Control

Within the CPAS model, Production Supervision is the heart of Process Control. Here, the guiding principle is flawless operation. To achieve flawless operation, control and transitioning should be executed explicitly by the system rather than implicitly by the operator. The operator is provided higher-level tools, which provide a performance perspective and the opportunity to intervene on an exception basis.

Manufacturers should exploit what the current automation technology offers to achieve operational excellence and suppliers should respond with their integrated control system offerings to help manufacturing companies to truly emerge as globally competitive entities. A collaborative partnership between users and suppliers will be truly beneficial in enriching both.

– A V Rajabhadur, Director – South & South East Asian Operations, ARC Advisory Group, raja@arcweb.com

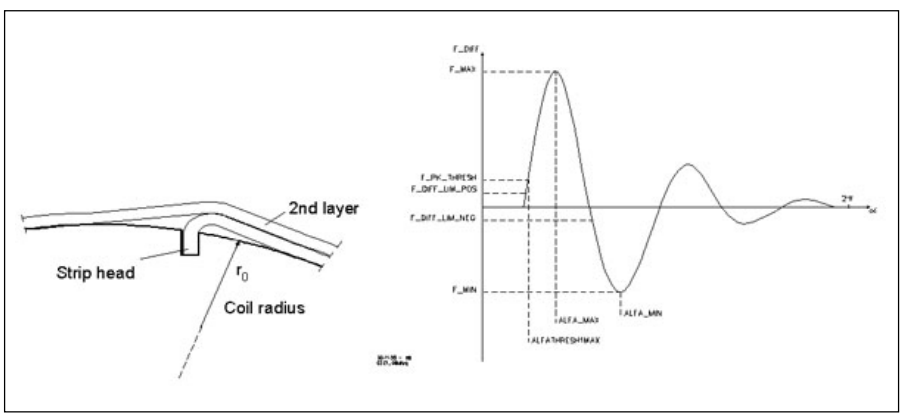
Advanced Process Control Strategy
for Compensation of Process Disturbances while Winding Flat Material

Introduction

To produce the very high quality of Steel and Aluminium strip that is demanded in today's quality conscious world, traditional control strategies are no longer sufficient. The demand for tight thickness and quality tolerance has been getting more stringent. One of the major control strategies that has proved to give major improvements in product quality and in mill productivity has been the 'Coil Eccentricity Compensation' control.

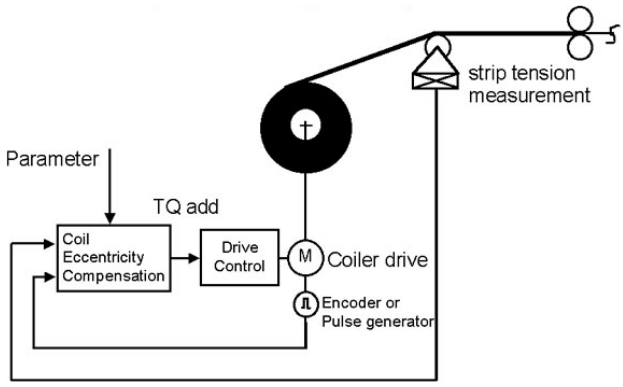
When wrapping strip on a mandrel, a relatively small change in radius over a short range of the circumference causes a very large deviation in strip tension. This periodic strip tension bump results in quality defects. Strip tension is a very important process variable for rolling. It influences quality aspects like thickness, width, profile and surface. In addition it can also influence the throughput of the plant and the acoustic noise level in the vicinity of the mill. For example if a tension oscillation is excited, other coupled process signals can also be excited (e.g. the strip thickness) so the rolling speed must be reduced to prevent a strip break in the worst case. Normal control strategies can fail because of the fast appearance of this disturbance. On the other hand, highly sophisticated optimising strategies are not realisable because the signal and process behaviour vary greatly.

The main reason for this periodic strip tension bump is the strip head that is pressed in the slot of the mandrel (refer figure below) or wrapped on a sleeve or on the mandrel. Tension disturbances occur at each rotation when the diameter change passes the contact zone of the strip on the coil. In high speed mills, the strip tension oscillations caused by the coil eccentricity can almost reach the magnitude of the reference value for the strip tension resulting in the strip becoming almost loose in each revolution. The typical form of the tension deviation due to the coil eccentricity is also shown below.



Description of Technology

The diagram below shows the concept of the CEC function with the process part and the necessary equipment for measurement and actuation of the CEC. On the mechanical side a direct drive without gear is supposed in this example. Two fast process signals are recorded: the strip tension and the coiler rotational angle. The coiler tension is measured with load cells at the bearing chocks of the deflector roll. The coiler rotational angle is recorded either by a pulse generator or an encoder installed at the motor shaft. Depending on the evaluation of those signals the torque of the coiler drive is influenced in order to compensate the strip tension peaks.



The solution concept consists of the following elements – Pre-identification, Fine Tuning and Sequential Tuning. In the Pre-identification phase, the start values for the two major control parameters of the compensation signal – Rotation angle and Amplitude– are identified. This is done at low speeds by means of applying a rectangular test signal on the process. This is necessary in each pass as the dynamic behaviour in each pass is not known exactly in

advance. With this test signal, it is possible to accurately determine the time delay between the start of the test signal and the minimum value of the excited tension deviation signal. This delay is used later in the actual pass to calculate the rotational angle at which to output the compensation signal depending upon the actual rotational speed.

The Fine Tuning phase rapidly finds the optimal value for the control signals by sequential optimisation during the actual pass. After switching on of the CEC, it starts with the values found in the Pre-identification phase. Starting from this point, by applying an optimisation method it is possible to relatively accurately and quickly reach the optimal amplitude and starting time of the compensation signal. This is done by first adjusting the amplitude in steps till the absolute values of tension deviation maximum and minimum are about equal. This is followed by adjustment of the starting angle.

In the Sequential Tuning phase, the variations of the dynamic process caused by the varying radius, rotational speed and coil inertia are followed and accordingly the amplitude and starting angle are adjusted. In principle, the sequential tuning could have been performed the same way as the Fine Tuning. But that would cause the tension deviations to swing on a regular basis as the control strategy tries to find the optimal point. On the other hand, a feedforward method is also possible. However, that could lead to errors because the dynamic behaviour is rarely reproducible. Hence in the sequential method, the rotational angle is kept relatively fixed and the sum of the actual values of maximum and minimum tension signal is evaluated all the time for each revolution. But experience has demonstrated that it is necessary nevertheless to examine over the period of sequential tuning if the chosen control output signal rotational angle is always correct. This is possible by evaluating the change behaviour of the maximal and minimal value of the tension deviation signal over one revolution with changing amplitude of the compensation signal.

The CEC switches on automatically when the strip tension deviation has reached a defined level and the strip tension deviation diminishes obviously. The CEC output signal is the additive motor torque with the parameters Amplitude and the Rotational angle.

Conclusion

Severe tension variations due to coil eccentricity have been a difficult phenomenon to control due to the fast appearance and disappearance of the disturbance. The above three pronged strategy to compensate for this disturbance has proved to be extremely successful and is beneficial in terms of improved strip quality, mill productivity and quieter mill operation.

– Krishnadas Manjaparra

Ethernet Technology in Industrial Control Applications

To automate your plant effectively, you need to network everything – from the simplest device all the way to the Internet. And, if your plant is like the most, you already have a number of networks installed for different purposes. But with a wide range of devices, networks and protocols you will likely have trouble getting all your system to speak the same language. This affects your productivity, increases your costs and limits your ability to react to change quickly.

EtherNet/IP, together with the ControlNet and DeviceNet (Open networks), allows sharing of data between different applications with ease. No extra hardware or additional programming is required. With this, remote customer order entry to manufacturing to product delivery becomes a reality. The network helps to communicate information seamlessly throughout the plant, from shop-floor to top-floor, and to and from the Internet for e-business applications. Ethernet technology has been used since the mid 70s and is widely accepted throughout the world, consequently it stands that Ethernet delivers the largest community of vendors in the world. The high demand for Ethernet-compatible control applications drove the design and creation of EtherNet/ IP. EtherNet/IP is an open network that uses existing commercial technology, including:

- IEEE802.3 Physical and DataLink Standard
- Ethernet Transmission Protocol Internet (TCP/IP) protocol suite, the Ethernet Industry Standard
- Common Industrial Protocol (CIP)

TCP/IP is the transport and network layer protocol of the Internet and is commonly linked with Ethernet Installations and the business world. To make EtherNet/ IP successful, CIP has been added to provide a common application layer. EtherNet/ IP uses the producer or consumer network model as do Device Net and ControlNet networks, which also use CIP. EtherNet/ IP is designed to handle large amounts of messaging data up to 1500 bytes per packet. In addition to data handling, EtherNet/IP's speed, 10/100 Mbps, makes data transmission even more appealing.

A common strategy of using open networking technology for seamless, top-floor to shop-floor integration is through Open Network Architecture. The architecture provides the ability to control, configure and collect data on a single network, thus simplifying the plant communications.

The complete EtherNet /IP solutions follow the

- Device Level, which allows users to reduce hardwiring, save installation time and costs, and gain valuable diagnostics from various sensors, actuators and other devices connecting to the control system.
- Control Level, which provides deterministic, repeatable performance for I/O, programming and peer-to-peer communication and data collection while spanning the entire manufacturing process from raw materials to finished products.
- Enterprise Level, which allows various MES and Data Archiving systems access to plant floor data for financial, quality, manufacturing and development purposes.

Ethernet IP provides easy and reliable solutions at Cadbury

Cadbury's 'Crunchie' is one of the top selling chocolate bars in the United Kingdom. While the plant used for producing the Crunchie Bar is modern, the existing control system, installed in 1981 was becoming a problem. Over 1 million bars can be produced each day at a rate of 1200 bars per minute. The honeycombed centre is mixed to produce high temperature foam. The foam is then fed onto a moving conveyor where it is monitored to maintain a constant thickness.

Ethernet / IP provided the backbone for all communications between PLCs and PCs running the SCADA software package. The SCADA allowed monitoring and controlling of automated machines and processes. With its rich graphics and enhanced tools an accurate representation of the large complex Crunchie line could be sent to operators in a remote Control room.

NB:
*Control Net is a Control Level open network maintained by an independent body called ControlNet International.
* DeviceNet is a device level open network maintained by an independent body called ODVA
* EtherNet/ IP is an information level Open

– Debashish Ghosh

Integrated Petrol Station Automation

Petrol Stations are getting increasingly modern and customer friendly...

Each oil company is trying to attract & retain its customers by creating a sense of assurance regarding Quality & Quantity of fuel delivered, good environment, slogans, added facilities like ATMs, shopping stores, coffee pubs, ice cream parlors and loyalty programmes.

Post IT revolution, its retail revolution gathering momentum, a simple credit card transaction today is however very time consuming.

In mature markets, a typical fuelling process would not take more than a minute for transaction processing (apart from the physical fuelling time). In this, the driver first swipes / shows his/her card for an amount of fuel desired. The system receives a pre-authorisation from the driver's bank & authorises the dispenser to fill for the corresponding amount. After fuelling, the exact amount is debited to the driver's bank account. System prompts for showing/swiping any Loyalty card, the same is shown or passed by the driver & a receipt is printed for the actual fuel filled with loyalty points.

Fleet owners pay at one location with their vehicles being able to fill even a particular fuel grade from any location.

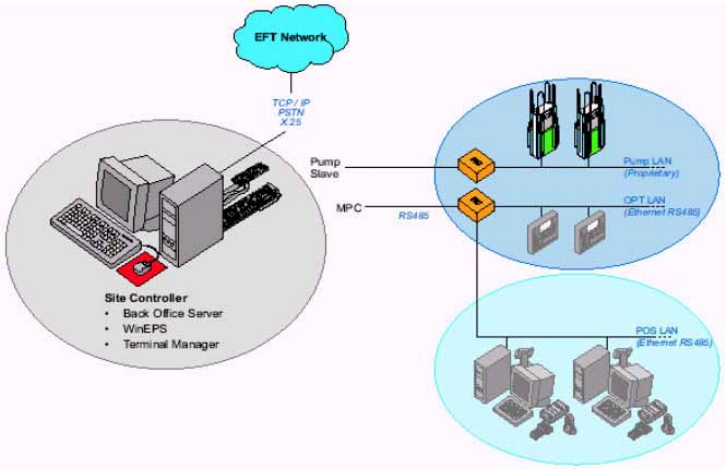
How does all this happen?
It is through integrated Petrol Station Automation linking fuel, non-fuel products & services at retail outlet, oil company & banks.

Automation

All dispensers, underground tanks & other forecourt equipments are connected to a Forecourt Controller (FCC) to check sales from each of them, drive Outdoor Payment Terminals (OPTs) used for customer interface containing card reader, keypad and display & printer.

A Point of Sale (POS) machine is located either on the forecourt for normal business hours OR/& in the manager's room for extended business hours.

Additional POS with integrated keypad, display, and barcode scanner & printer can be located in the convenience store.



All fuel stations are further connected to banks for payments & oil company head office for driving business electronically with oil companies able to uniquely identify its customers, transfer pricing data & monitor operations online.

Forecourt Controller Technologies available are on solid state or PC based platforms. Solid state platforms have fast boot-up time & free from Windows OS related problems, however they are too proprietary in nature & not economically modular & scaleable. PC based platforms are more open, upward scaleable & replaceable. Both technologies need to be protected from power outages.

POS Technologies also come in solid-state or PC based platforms.

OPTs for payments & loyalty come ruggedised suitable for forecourt application. Some even comply with EMV Level 2 requirements which would be demanded by banks for all credit card transactions in a year or two.

Dispensers moving up!

While the Automation system expects the Dispenser to only be a dumb slave executing the commands sent by it, Dispensers are also moving into automation space. Dispensers now have receipt printer & card reader to address the loyal customers operating with smart cards. The day is not far when dispensers would handle almost all functions making most of the Automation system redundant!

Whichever way automation & dispensers move, benefits would be available to end-customer, dealers & the oil company.

Benefits

End-customer sees increased speed of transaction, quality & quantity confidence with the printed receipt, easy payment mode options & good quality time at the Outlet.

Dealer sees improved efficiency with auto billing, fast fuel reconciliation, audit trail, automatic reporting, facility for extended business hour operation, easy local account handling & even remote viewing of retail outlet.

The oil company benefits include CRM on forecourt, improved monitoring & control of retail outlets, no stock dry-out & readiness for dynamic pricing where fuel rates could be one in the morning & change in the evening or even different on opposite sides of the road depending on traffic direction.

While all this is a reality in mature markets, the road ahead needs to be well planned for success.

The Indian context

Our fuel stations are small & busy, credit card transactions are slow & not linked with the nozzle, power supply failures are common and old, rickety generators do not provide clean power.

The solutions around the Indian context revolve not only on forecourt technology platforms but also the operational & environmental issues. One needs to regularise the solutions. Typically issues are, what happens when a card is swiped & power fails OR a card is shown for a transaction & then the driver decides not to fill OR there is a long drawn black out OR the operator wants to continue filling the next 2 wheeler without putting the nozzle back?

Planning

No benefit comes without planning. Oil companies need to identify their ***Strategic Goals***, i.e., Q&Q or Profitability or Customer attraction & retention or Control of Retail Outlets or all of these.

Strategic Initiatives follow strategic goals. These may involve buy-in of the oil company management, pilot project trials across the country, training of ground level staff, setting up communication networks, message sample data & even work with banks for electronic fund transfer facility through an automation system.

Technology Solutions follow experience gained through strategic initiatives before a countrywide rollout of automation.

Future

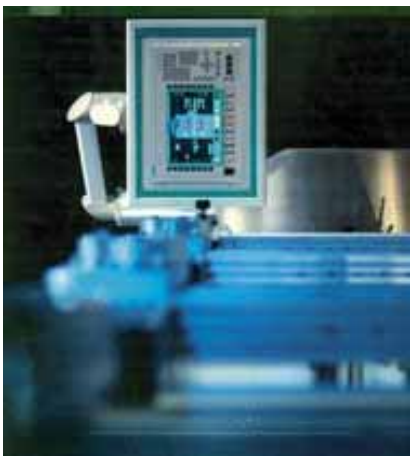
The future may be a bit away but it is certain that we would see lesser crowded stations with happy dealers & a smiling customer uniquely pampered by the oil company.

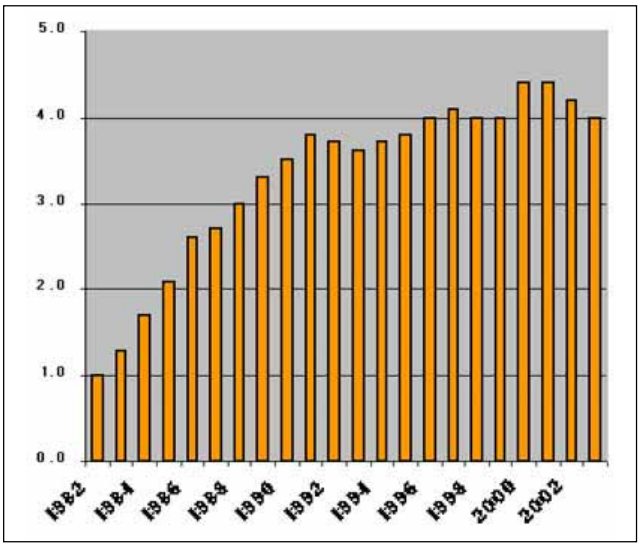
– Russy Master & Sujit Dey

PLC in Automation

Today, programmable controllers are an elementary component of state-of-the-art automation solutions. Intelligent solutions are not based on a conflict between these systems, but on unity. With important advantages like, robustness and easy handling, the PLC continues to guarantee its success. Its further development will be dependent on more & more steadfast integration of information & technology. For the engineering process, this means an integrated workflow that covers all engineering tools; for production, it means transparency of the data flow between a company's production processes and its business processes.

If official market studies of a few years ago were to be believed, the PC was supposed to replace the PLCs completely which meant PLCs would play very little or no role in automation. However, the fact is, the PLC's market volume, worldwide, has grown from one billion euros in 1982 to 4.5 billion euros proves that automation without PLC's is unimaginable and growth is continuous.





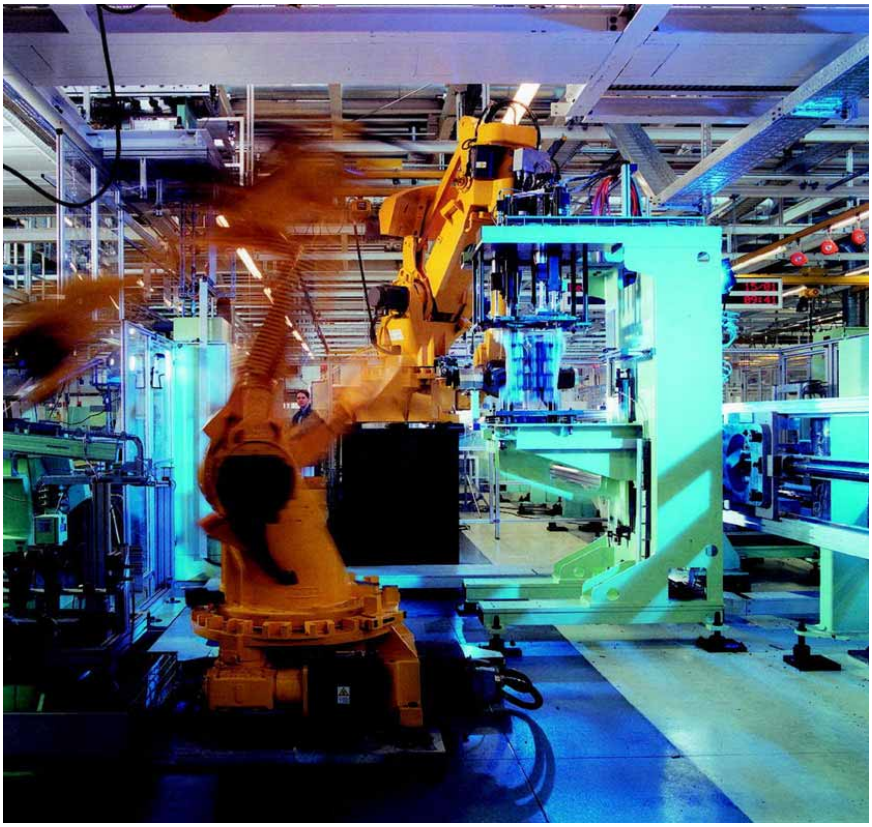
World wide growth in PLC market over the last 20 years proves the fact that automation without PLC is unimaginable.

Robustness is an important prerequisite for the success of the PLC. Most state-of-the-art controllers are easy to use, modular, and require no fan. Sometimes, modules can even be removed or inserted while energised (a process referred to as hot swapping). Today, a PLC is distinguished by a large number of scalable technology functions such as counting, measuring, positioning, closed-loop control or cam control. With a graduated selection, which extends from entry-level PLCs to high-performance models, there is a suitable solution for every task.

As far as programming and configuring are concerned, there is much to choose from the basic LAD, FBD and STL programming languages over graphical languages for sequencers, state graphs and process flow charts to high-level languages Particular attention is paid to integrated engineering. The repeated input of data means not only more overheads, but also an increased danger of input errors. Both must be avoided through the interaction of modern engineering tools for program development, including HMI and communication.

The possibility of simulation shortens the test phase and can be used to optimise functional sequences without the need for target hardware. In addition, open interfaces can be used to import or export data, for instance from upstream planning tools.

All important bus systems, such as AS-Interface, Profibus and Industrial Ethernet, can be connected over different communication interfaces. Modern information technologies (IT) based on Industrial Ethernet offer simple solutions for local or global business networks. The basis for safe global communication is TCP/IP. The use of Web technologies and an e-mail function make worldwide communication in the automation world possible.



Safety technology is an important component of many automation tasks. Today's state-of-the-art PLC offers an integrated safety concept.

Fail-safety is increasingly becoming a must feature these days for any powerful PLC. Wherever the highest continuous safety is required for humans, machines and the environment, fail-safe controllers are absolutely essential. They are suitable for the processing of safety-related functions. When a fault occurs, they immediately switch to a safe state. The most sophisticated controllers now offer an integrated safety concept, i.e. the bringing together of safety level with standard automation to form a transparent system.

Today's PLCs are capable of controlling extremely fast machining processes. Process response times must be defined and reproducible, even in distributed solutions. The IO signals must be read in and read out in an equidistant time frame and synchronised with the user program – a must for sophisticated motion control tasks.

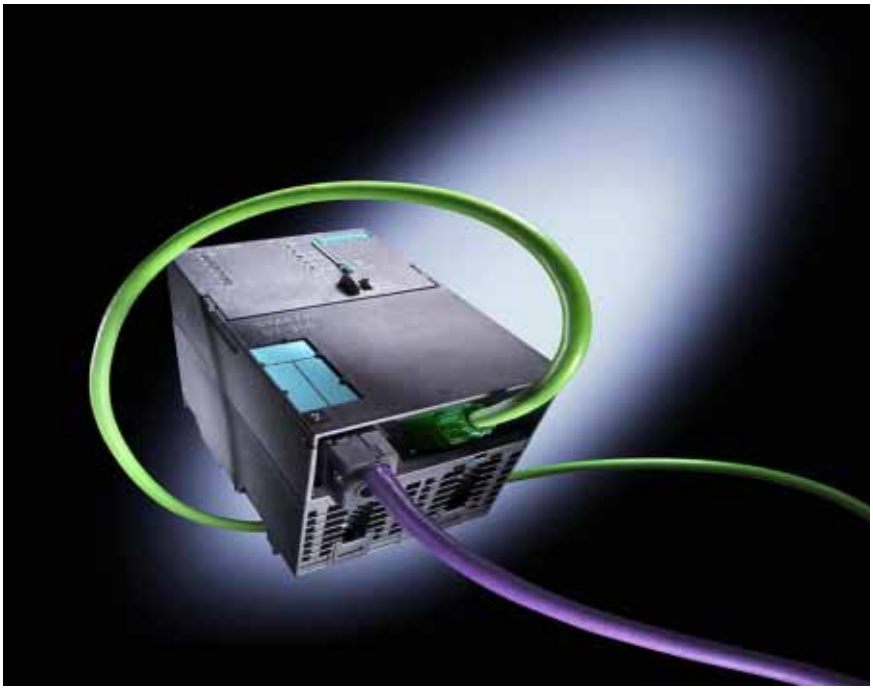
Plant or Machine availability – an important topic

Powerful integrated system diagnostic functions increase the availability of the controller and help during the commissioning phase. Thanks to plain text messages showing the type of fault, the date and a time stamp, faults can be quickly rectified either locally or via remote diagnostics. In cases where availability plays an important role, there are also high-availability control systems in which a standby assumes control in the case of a device failure, preventing production delays in round-the-clock production environments.

In recent years, PLC applications have grown to include process engineering. This requires the capability to carry out plant modifications and expansions even while the plant is in operation, regardless of whether this involves adding sensors or actuators or simply assigning new parameters to a module. The PLC was able to penetrate this application field thanks to hardware and software for intrinsically safe, fail-safe and high-availability solutions and engineering that speaks the "process language".

Integration is the crux

In all sectors, interesting solutions can be found which have been implemented with products from PC-based Automation, Soft PLC, Slot PLC or embedded solutions. The automation engineer is confronted on the one hand with the task of deciding the optimum hardware platform and on the other hand with having to maintain continuity in programming, maintenance, HMI and communication. Maximum discretion can be attained with an integrated spectrum, which also includes the standard PLC. The user program can operate without modification on both the standard PLC as well as on the Soft PLC or Slot PLC. The result is unity rather than conflict. The right solution can be selected in dependence on the primary focus of the task in question.



PLC or PC? – No conflict, the optimum solution can be made dependent on the task at hand

New automation solutions with the PLC on the basis of distributed intelligence

The use of distributed intelligence is a huge step forward in modular plant and machine construction. In this conjunction, PLCs can serve as the intelligent, freely programmable core of a plant or machine module. The modules are developed and tested autonomously. The advantages are the ease with which these modules can be re-used and the clean interplay between modules over standardised communication links.

Automation remains innovative – The PLC remains the basis

The ability to respond more quickly to changes in the market and implement increasingly individualised mass production require production to be flexible. All required information must be available anywhere in the company at any time. This makes it possible to ensure a continuous information flow over the entire supply chain, from suppliers over the company's own production to the customer, taking into consideration the company's business processes (ERP).

The main challenges to production are detecting faults before they can cause a failure and organising maintenance tasks. One approach to this problem is a cross-production maintenance and service concept.

The engineering process for the development of a plant or machine also requires an integrated flow of information between all participating engineering tools. The island solutions which frequently exist today, in which multiple experts with limited responsibilities and competence master their part of the overall process, must melt together in future into an integrated workflow which extends from rough design to successful commissioning, making it possible to progress more quickly from initial idea to productive operation.

The further development of automation technology is therefore no longer distinguished by the individual development of individual components and products; instead, the main objective is the integration of all components belonging to an automation solution. In future, the PLC will continue to play a central role in automation.

– N Girish

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