BoOM

Book of Obsolescence Management

Using obsolescence to your advantage

Includes
EU Automation's seven steps to
obsolescence management

Contents

Mark Proctor and **Jonathan Wilkins**

What you hold in your hands has survived thousands of years of innovation and technology. Writing dates back to Bronze Age Mesopotamia and Ancient Egypt, but throughout its history has taken many forms - from hieroglyphs to the phonetic alphabet of modern languages - and it has used a range of formats, from clay tablets through to the printing press and the smart tablet you might be using right now.

Obsolete. The word conjures a variety of different connotations, none of them particularly positive: useless, old, dated, broken - we've heard it all.

But we disagree. It's why we decided to write this book; to help consumers, manufacturers and suppliers better understand the process of obsolescence and the effect it has on the entire manufacturing chain.

At EU Automation we can feel obsolescence speeding up and beginning to affect a wider range of industries. We had our own ideas as to why this was happening, but wanted to put the question to other industry experts. We weren't disappointed with the answers!

We would like to thank everyone who helped make this book happen – our team for their support, all the interviewees for their wisdom and our readers for their interest.

As we stand on the brink of another industrial revolution - one that sees highly intelligent and connected devices running industrial systems with minimal human intervention - this book is a reminder of the devices that have got us here and will continue to help us move forward in the years to come.

Chapter 1:
Obsolescence why it matters

Let's begin at the beginning

We live in an interconnected world of tech, progress and innovation. Ambition drives us to transcend boundaries previously thought insurmountable - it's what took us to the Moon with technology that had less processing power than the smartphone in your pocket and more importantly, it got us back to Earth too.

In this era of rapid technological developments in computing, automation and big data, we're enjoying more perks than ever before. However, a less obvious consequence of the increasing rate of technological change is that more and more hardware and software tends to get left behind and forgotten.

Obsolescence occurs when an object or service is no longer manufactured, even though it may still be in good working order. The most common reasons products become obsolete are technological evolution, market changes, environmental policies and planned obsolescence.

“The most common reasons products become obsolete are technological evolution, market changes, environmental policies and planned obsolescence.”

Consumer technologies usually have a relatively short life span, so obsolescence and regular upgrades are common occurrences. When your smartphone fails, you're usually able to replace it on the day, with a relatively small investment.

However, industrial systems often have a lifespan of several decades, so when a product that is no longer made by the original equipment manufacturer (OEM) breaks down, the best option is not always to upgrade the entire system.

So, what are the options manufacturers have when faced with obsolescence? One idea is to upgrade or replace the entire system. This is a bit like buying a new car every time your clutch breaks.

Alternatively, there's the option to source a like-for-like replacement. Remember, obsolete doesn't necessarily mean defected, useless or impossible to get hold of, it often just means the product is no longer manufactured by the OEM.

Although spares can be hard to come by, finding a replacement is immensely kinder to the bank balance and significantly quicker than an upgrade. However, there are limits to how many working spares there are in the world.

This leads us to the heart of the matter and the subject of this book. Managing obsolescence in industry is an increasingly important issue that is now affecting more sectors than ever before.

To glean a better understanding of the process, we've put together a collection of interviews from different sources within industry, plus information and tips along the way. At the end of the book, you'll find EU Automation's seven steps to obsolescence management, a method that is guaranteed to reduce the obsolescence burden.

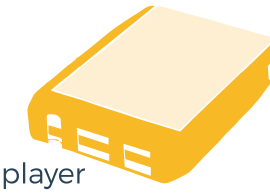
So before you chuck that obsolete motor and completely revamp your system, think of those brave souls that got to the Moon with less computing power than your smartphone, and have a flick through the Book of Obsolescence Management.

Obsolescence timeline

1968
Steam train
Last British scheduled steam journey

1960

1968
Relays for automation and control



1970

1975
8 track player

1980

1993
Betamax
1997
Allen Bradley small logic controller (SLC) 500 series

1990

1990
The mullet
1990s
Mainframe computing

2000
Nokia 3310
September 2000
2007
Siemens operator panel OP7

2000

2009
GE Fanuc
dissolved Aug 18

2013
Dial-up internet
September 2013
(BT stops providing the service)
2014
Mitsubishi E1000 series terminals
2020
Desktop software
2023
Maps

2010

2010
PDAs
2012
Omron CQM1-OD214 programmable controllers
2014
Allen Bradley 2711-B5A2 operator interface
2015
Windows XP

2020

2025
Cash transactions

Chapter 2:
Obsolescence in consumer environments

Smarter devices, shorter lifespan

Whether it's your phone, your car or your coffee maker, every consumer product has a lifespan. What you might not know is that this lifespan is sometimes predetermined by the manufacturer. Planned obsolescence is a strategy in which the obsolescence of a product is built into the product from its conception.

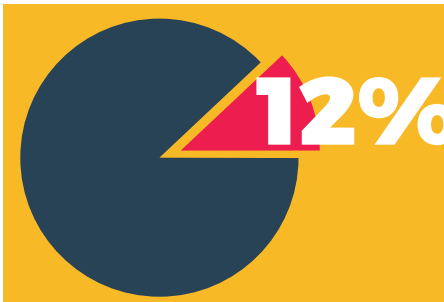
Some planned obsolescence is unavoidable. Take the battery life of a smartphone, for example. There are only a finite number of times that the chemical reaction that occurs in the battery to allow charging can happen. A manufacturer can easily predict when this chemical process is likely to degrade severely and when the battery might need replacing.

However, finding a balance between planned obsolescence and good design in the consumer world can be tough. Some electronics manufacturers have been accused of deliberately shortening the lifespan of their products to nudge consumers to make new purchases.

For example, heat sensitive components in TVs are sometimes located next to the heat sink - the part that draws heat away from the unit. This means the vulnerable parts can sometimes be affected by the excess heat and stop working. While a tech-savvy viewer might replace the component, many would opt for purchasing a new TV.

When confronted with criticism, manufacturers have been quick to point out that in flat screen TVs, there isn't room for heat sensitive components to be anywhere else, illustrating just how difficult it is to achieve the delicate balance between design and life span.

To address these issues, sellers of consumer goods within the European Union have to offer a two-year warranty after the delivery of the goods. The final seller, who is responsible to the consumer, can also hold the producer liable.



“Only twelve per cent of smartphone upgrades involve older devices being sold or traded for new ones.”

As well as the ethical issues behind planned obsolescence, we should also consider the environmental impact of the strategy. Only twelve per cent of smartphone upgrades involve older devices being sold or traded for new ones. This means the majority are relegated to that drawer of bits and bobs we all have in our homes, destined for the bin one day.

This chapter explores obsolescence in consumer electronics and helps readers understand what they should look for when considering the life span of their beloved phone, TV or coffee maker.

Nothing lasts forever

Planned obsolescence refers to designing a product with an artificially limited useful life. This means the device will become obsolete after a predetermined period of time. Although the concept might sound opportunistic, some companies have been known to use planned obsolescence in a way that benefits the customer.

Planned obsolescence affects a variety of industries and sectors, but it is particularly prevalent in the consumer electronics market.

Designing certain products to be less durable than they could be actually conserves resources and delivers a more affordable product to the consumer. If you had an indestructible phone made out of titanium - or perhaps just the Nokia 3310 - it would never break, but after a couple of years its functions would seem ancient. The consumers might get a phone that lasts a lifetime, when in reality, they want it for a few years, not decades.

Software updates for computers and smartphones are cited as purely moneymaking schemes from manufacturers that do little to actually improve user experience - slowing down operating systems and draining batteries. However, these updates often contain security patches to known systems vulnerabilities. Without the fixes, doors would be left wide open for hackers.

The bottom line is that a customer always has the choice of competing brands when they perceive their TV, computer or phone to be outdated, so why would manufacturers speed up the process of jumping ship?

Nobody likes change, especially when you have become accustomed to a particular device's idiosyncrasies. It's the same when an industrial component falls prey to planned obsolescence. When something fails in an industrial environment, the facilities manager faces the choice between sourcing a replacement, which may be obsolete, and putting faith in an unknown upgrade.

“Software updates often contain security patches to known systems vulnerabilities. Without the fixes, doors would be left wide open for hackers.”

Chapter 3:
Obsolescence in industry

Obsolescence and industrial automation

Imagine your washing machine stops working. You're handy with a toolbox, so you take the machine apart and assess that the motor is broken. The rest of the machine is in working order. You ring up the supplier or the manufacturer to order a replacement motor only to find out your model is now obsolete and spares are no longer available. You're going to have to shell out for an entirely new machine. Now imagine this scenario on an industrial scale, with every minute of downtime costing you a minimum of £2,000.

With so much on the line, there's no wonder obsolescence is a hot talking point in industry. Ideally, if an obsolete component or application breaks down, plant managers should upgrade the entire system. This ensures compatibility and minimises the risk of further components in the system becoming obsolete.

However, in most cases, a full system upgrade is not always viable, partly due to the high costs of the operation. Additionally, in highly regulated industries, such as nuclear and pharmaceuticals manufacturing, upgrades also mean reams of paperwork and red tape. In this case, the easier option is sourcing an obsolete like-for-like replacement. No need for extended paperwork, costly upgrades or scrapping a perfectly good system.

This is the basic idea behind managing obsolescence in a manufacturing facility – maintaining systems (sometimes critical ones) by sourcing obsolete components.

Through extensive planning and risk analysis, obsolescence management can keep industrial systems running efficiently and in line with national or international standards. It's little wonder that a broader range of industries are now turning to obsolete components instead of upgrades to keep applications running.

This chapter delves into what obsolescence in industry really means – from the factory floor to the big wigs at the top - and the specific challenges individual sectors face on a daily basis.

“Through extensive planning and risk analysis, obsolescence management can keep industrial systems running efficiently and in line with national or international standards.”

Beware and prepare

The problem of obsolescence in industry is driven by a dichotomy between the need for rugged, long-lasting systems and shorter product lifecycles. Control systems in industrial plants can be up to forty years old; however, components in Programmable Logic Controllers (PLCs) or Human Machine Interfaces (HMIs) often become obsolete in five years or less. If one of these devices breaks down and needs replacing, the consequences can be severe if companies aren't prepared.

When an obsolete device breaks down and causes production to stop, every minute costs thousands of pounds. It is up to plant managers to find a swift solution. However, sourcing obsolete parts is not as easy as ringing the OEM and having one shipped out.

One of the risks of obsolescence is redesign and requalification. Alternative devices are usually available when obsolete parts break down, but problems arise when designs need to be subjected to a new clearance or qualification process for the new equipment to be approved.

Redesign and requalification are major expenses and if companies do not have a proactive obsolescence management plan in place, they will most likely be going through redesigns on a regular basis.

A growing problem associated with obsolescence in industry is counterfeiting. When companies are desperate to source obsolete parts quickly, they often become less vigilant towards counterfeit goods. These products are inferior in quality and will most likely not meet safety or efficiency regulations. Knowingly or unknowingly installing counterfeit devices into a system is not only dangerous, but also perpetuates the obsolescence management problem.

The key is to understand all the parts in a project and the risks involved as and when components become obsolete. When an obsolescence strategy is in place, managers can order products before components break down by maintaining relationships with an obsolete parts supplier, thus minimising costly downtime.

You’re not alone

Stuart Kelly is a man in the know about obsolescence. MD of obsolescence management specialist Through Life Support (TLS) and president of the International Institute of Obsolescence Management (IIOM),

Kelly talks to us about professionally managing obsolescence in industry.

What would you say are the main problems industry faces from obsolescence?
The product life cycles of the components used in equipment are getting shorter and shorter. In fact, this is often significantly shorter than the expected operational life of the products we need to support.

The amount of parts discontinued annually has significantly increased throughout the years. In 2014 alone, 500,000 electronic components were discontinued. Often, commercial decisions made by manufacturers are the main reason for product obsolescence - for example the consumer electronics market dominates the semiconductor industry.

Other times, legislation such as the Restriction of the Use of Certain Hazardous Substances (RoHS) and Registration, Evaluation, Authorisation & restriction of CHemicals (REACH) also makes parts obsolete.

For any equipment that has to be supported for a significant period of time, obsolescence can be a major cost driver and can impact equipment at all stages of the acquisition process.

> **"In 2014 alone, 500,000 electronic components were discontinued."**

When a part failure occurs, modification or maintenance is required; a major problem can develop if the replacement part is no longer available from its original manufacturer or any other approved sources. This can often result in the most expensive resolution - i.e. a redesign - being the only option available. Early identification of obsolescence risk allows a wider range of options to be considered and reduces the actual cost of resolution.

> **"Early identification of obsolescence risk allows a wider range of options to be considered and reduces the actual cost of resolution."**

The rate of obsolescence is increasing and the financial and availability risks to equipment will continue to require careful management to reduce through life costs. There is clear evidence that proactive obsolescence management (OM) can significantly reduce such costs and minimise interruption to supply.

Unforeseen obsolescence issues can happen quickly and cost a significant amount to resolve.

This can result in:
- Loss of equipment capability (production down time)
- Significant increase in through life support costs
- Reduced credibility with customers

Although electronics are most likely to be discontinued, obsolescence of non-electronic and commercial off-the-shelf (COTS) items also poses a significant problem to long life systems.

Which industries do you think are most affected by obsolescence and why?

The discipline of proactive OM has its roots in the diminishing of manufacturers' sources and material shortages (DMSMS) specialism that started in the US in 1978. In the UK, we subsequently developed OM policies and procedures as we became more aware of the risk that our equipment was facing. This was partly due to an increase of commercial parts finding their way into our projects.

In 1996, a group of like-minded individuals with a shared goal of improving the discipline and providing a community for those who have an interest in the subject, got together and the Component Obsolescence Group (COG) was born. Clearly, for those involved in the early years, OM was a more palatable term than DMSMS.

> **"Anyone using equipment with considerable life spans - typically ten years and above - will have obsolescence risks within their systems that will need to be proactively managed."**

In the years since, the specialism of OM has significantly grown. In addition, the DMSMS community in the US and the OM community in the UK and in other countries – Germany in particular - have flourished. There is a heightened feeling that the risk from obsolescence is real, that it is becoming more important and requires robust processes that need to constantly update and evolve.

The early COG members were mainly from the defence sector but now, membership also comes from aerospace, rail, nuclear, oil and gas, automotive and medical.

> **"Industry now has to understand obsolescence risk within key decisions companies make by introducing pro-active OM processes within their organisations."**

Anyone using equipment with considerable life spans - typically ten years and above - will have obsolescence risks within their systems that will need to be proactively managed.

Could you give us an example of how industry has had to change to mitigate for technology becoming obsolete quicker?

Industry now has to understand obsolescence risk within key decisions companies make by introducing pro-active OM processes within their organisations.

For example, during the design process of new products, or even modifications to existing products, there is a significant opportunity to mitigate obsolescence risk. Instead of focussing on whether it can be done with faster, cheaper or lighter products, one of the questions that should be asked is 'what is the obsolescence risk in the selection of technology or parts that I have just made?'

There are many examples where obsolete parts have been used in the design of a product. Even before products enter service, they can have considerable obsolescence risks.

By choosing technologies or parts with the longest predicted lifecycle, organisations can mitigate obsolescence risk. Therefore, the obsolescence impact of a new design should be discussed as part of an organisation's internal design review process.

Clearly, there are other aspects to a design that may result in the obsolescence risk being tolerated, but it is important for companies to understand and review it within the decision process.

> **“Having this specialist resource, coupled with effective processes and tools, can have a positive impact on understanding, analysing and mitigating obsolescence risk.”**

Another example is the change in contracting methods; more and more contracts are moving the support risk to the suppliers. From an obsolescence perspective, this could mean the responsibility for the payment of obsolescence resolutions could lie with the supplier. In this case, understanding the obsolescence risk and, more importantly, predicting the cost of these resolutions over the coming years is crucial. Obsolescence cost prediction models can help in these situations, but it is a clear change that industry will have to be ready for.

What can companies do to keep on top of through life management of devices in their plants?

The only way to mitigate the obsolescence risk is by implementing a proactive OM capability. The objective of proactive OM is to ensure that obsolescence is managed as an integral part of design, development, production and in-service support in order to minimise its cost and impact throughout the product life cycle.

> **“The IIOM’s role is to continually improve the OM discipline and to develop a professional framework, career path and qualifications for obsolescence managers worldwide.”**

Many companies now have obsolescence managers and even OM teams. Having this specialist resource, coupled with effective processes and tools, can have a positive impact on understanding, analysing and mitigating obsolescence risk.

The number of companies employing dedicated obsolescence managers, or even teams, has increased in recent years. A major reason for this is that many customers are now including OM within their support contracts. This is particularly relevant for defence, where it is a mandated requirement from UK Ministry of Defence. Recently, other industry sectors, such as oil and gas, are now contracting to ensure that OM is performed in their projects.

Many of the operators within oil and gas - for example, BP, Total, Statoil, amongst others - have developed an OM specification to ensure their supply chain manages this problem. Many other companies are implementing proactive OM as they realise it is a cost saving opportunity that could be a differentiator in winning support contracts.

How can the IIOM help companies struggling to manage obsolescence?

The International Institute of Obsolescence Management (IIOM) was created in response to the growing scope and sophistication of obsolescence management.

Networking and knowledge sharing will continue to be the major benefits of joining IIOM. The IIOM's role is to continually improve the OM discipline and to develop a professional framework, career path and qualifications for obsolescence managers worldwide. It is a professional body for those involved in OM and who are dedicated to furthering their knowledge and understanding of the discipline.

The IIOM Biennial International Conference hosts delegates from around the world and OM is practiced in many countries - 13 states have officially adopted the international standard for OM - IEC 62402. Therefore, IIOM is committed to becoming a truly international organisation.

Individuals and organisations from any country can join IIOM. When a sufficient group of members in a single country or territory exists, a separate national chapter can be formed and led from that country. There are currently UK and German chapters and it is planned that Benelux and US chapters will form in 2016. Other countries have also expressed an interest in forming a chapter.

Member companies have access to solution providers, learning material, training opportunities, networking events and can keep up to date on the latest news and initiatives within the OM discipline. Meeting and learning from others in the same position with similar problems has provided invaluable for IIOM members.

The IIOM mission is:

- **Advance the science and practice of OM**
- **Promote and recognise high standards of practice and professional competence**
- **Open opportunities for development and career paths for practitioners of OM**
- **Generate widespread awareness and understanding of the discipline**

Product obsolescence vs. technological obsolescence

Products become obsolete for different reasons. Sometimes new regulations within a sector render a variety of non-compliant products obsolete. Other times, product or technological discontinuance are the reason.

> **“Product obsolescence occurs when an OEM no longer produces or supports a product.”**

Product obsolescence occurs when an OEM no longer produces or supports a product. For example, when Allen Bradley stopped manufacturing its popular Small Logic Controller (SLC) 500 series and replaced it with the ControlLogix family, this was a case of product obsolescence in industry.

Technological obsolescence refers to a technology that has been rendered less useful due to a superior technology becoming available. A good example of this type of obsolescence comes from the way music formats have changed over the years: vinyl records gave way to the eight-track tape, then cassettes and so on, up to modern day high definition (HD) audio files.

This musical analogy is particularly pertinent because it highlights that obsolete does not necessarily mean useless. Vinyl records first had their heyday in the 1970s and 80s before they looked doomed for the black hole of obsolescence thanks to smaller, portable formats. However, sales of vinyl have been steadily rising since the end of the noughties.

In the case of both product and technological obsolescence, manufacturers are often reluctant to change to the new platform or device, especially if this change has expensive repercussions for their production line. This is why many companies actively choose to continue running systems reliant on obsolete technology rather than implement a costly upgrade.

> **“Technological obsolescence refers to a technology that has been rendered less useful due to a superior technology becoming available.”**

The engineering and IT dichotomy

Phil Gillard is an industry expert with a wealth of experience in the industrial automation sector.

Here, we talk to him about the increasing mix of engineering and IT and its effect on obsolescence in a plant environment.

What is your experience of obsolescence in an industrial environment?

Personally I have seen multiple different cycles of obsolescence since I started in industry in 1982. At that time, PLCs were just starting to be adopted as were microprocessor based single loop controllers and some of the DCS technology was based on ferrite core memory!

The industry at that point in time was very conservative, as were many plant managers. I can remember one of my managers wanting multiple (non-microprocessor) diverse systems in place to protect the control system before he felt comfortable.

The justification for replacement was mostly based upon the lack of availability of spare parts, such that the (breakdown of the) control system became a major risk to plant availability and seldom based upon new functionality. The three big barriers to replacement being the time, effort and cost to replace the system and an extension of the conservative thinking i.e. “if it isn’t broken don’t fix it.”

At this point in time, control system vendors had complete control of their product cycle. They were normally only reliant on the IT world via the supply of microprocessor chip set and memory.

The vendors - of which there were many more then there are today - would develop their own hardware, software and operating systems. They would only look towards the IT world when the IT components would not have a direct effect on plant availability, for example using DEC RL-02 discs for loading software and data storage or using the DEC PDP 11 operating system for basic MIS functionality. The vendor’s product lifecycle would typically reflect the replacement cycle of the plants they supported.

“This balance changed when far-sighted vendors started to introduce components and sub systems from the IT world.”

This balance changed when far-sighted vendors started to introduce components and sub systems from the IT world. Three of the most significant that I recall were Wonderware starting to use the Windows operating system for SCADA, Foxboro starting to use UNIX as the base operating system for their DCS and Fischer and Porter using Ethernet as the primary network for their DCS

What are the factors bringing about faster obsolescence?

As discussed above, when the control system vendors started to use the components from the IT world as critical parts of their systems, they had the advantage of reduced development costs, but also lost some control over their product lifecycle.

What are the key trends affecting obsolescence management at the moment and how do you see the practice evolving in the next ten years?

a A human element

In the early days of control system technology, vendors developed specialist keyboards for use in the control room, on the (probably warranted) belief that operators could not use a QWERTY keyboard or mouse. This is now far from the case and is indicative of the level of influence from the world of consumer technology.

Subsequently, there is pressure from both operators and engineers for companies to provide them with tools and systems which are, at least, equally functional when compared to the technology in their house and car. If this gap is not bridged, I further believe it will be increasingly difficult to attract the best young brains into industry.

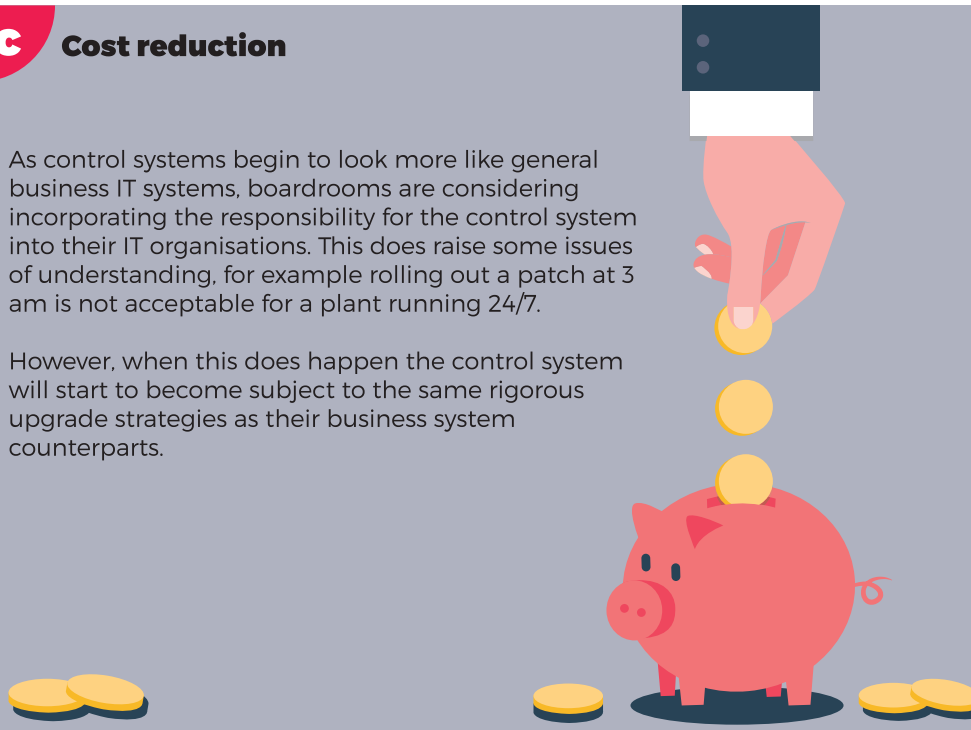
b A security element

It is clear that the issue of cyber security is now being raised to board level. Given the fact that the control system is subject to the same risks as the IT world - with perhaps even greater consequence, when we consider the effects of a successful attack on a nuclear plant, refinery or even water treatment plant - it is obvious that upgrading systems to make them secure will become an increasing pressure.

c Cost reduction

As control systems begin to look more like general business IT systems, boardrooms are considering incorporating the responsibility for the control system into their IT organisations. This does raise some issues of understanding, for example rolling out a patch at 3 am is not acceptable for a plant running 24/7.

However, when this does happen the control system will start to become subject to the same rigorous upgrade strategies as their business system counterparts.



d IOT (Internet of Things)

Control systems are a form of industrial IoT and in fact, industry has been doing IoT for a long time - using real time data from sensors to control the way we operate and manage our resources and time.

The IoT is going to become a much bigger market than the control systems one and, I believe, will influence our market in the same way that the IT / consumer has started to do. The greatest influence will be the price point of each sensor, in the same way that the IT world has reduced the cost of the operator interface, IoT will do the same for the sensors, their infrastructure and the management of the data.

The IT world works on a vendor driven lifecycle of typically six months and a user driven replacement cycle of typically 36 months. This is in direct contrast to the previous control system replacement cycle of seven to ten years.

I believe it is this change in the control system supply chain, which is creating a tension between the needs of the industrial world - longer replacement cycles with proven systems - and the IT / consumer world - short replacement cycles and shiny new functionality). This tension is driving the pressure for a reducing control system lifecycle.

Do you see a way in which obsolete technology and modern devices can work in harmony?

Absolutely, we are seeing many plants going down the route of maintaining older systems, while supplementing automation infrastructure with mobile technology. Factories will still use traditional hardwired Ethernet based protocols and networks with engineers and operators having the convenience of a mobile interface and remote access.

Imagine having a tablet that recognises its location, the part numbers of plant assets around it, is able to recall previous maintenance regimes and display historical performance. The benefits to engineers would be immense. Using this technology while still being able to see the traditional displays in the control room, should the mobile technology not be available, would mean supervisors would miss nothing

Product obsolescence or product evolution?

Renishaw is a global engineering company with core skills in measurement, motion control, healthcare, spectroscopy and manufacturing. The company has 40 years of experience and prides itself on its dedication to research and development.

Here, Patrick Tampkins, quality director for metrology products at Renishaw, shares his tips for managing product lifecycle and obsolescence in industry.

Please tell me a little bit about Renishaw's experience with obsolescence.

Like many manufacturers, Renishaw experiences both sides of the obsolescence coin. We need to manage the obsolescence of the items we buy and use in our manufacturing processes, as well as the obsolescence of the products we sell to our customers.

Renishaw's focus on research and development means we often lead the market in product development. This also results in our products having a relatively long commercial lifespan. It depends on the product, of course, but in our coordinate measuring machine (CMM) and precision measurement range, products can often be available for sale for 15 years or more.

> **"The first rule of obsolescence is: don't obsolete a product unless you really have to."**

What happens when one of your products becomes obsolete?

When it comes to making a decision about whether to obsolete a product, we first look at supply and demand. Some portions of the market may continue to use the same product for years and years because it is what they need.

Our mantra is that as long as our clients are still interested in buying our products, we are happy to continue to make them. One of the risks of making a product obsolete is that it forces your customer to make a change, even if only to the part number they buy. This changes the status quo, which could create an opportunity for your competition.

In my view, the first rule of obsolescence is: don't obsolete a product unless you really have to.

What kind of support do you offer for your customers when one of your products becomes obsolete?

For one thing, we work in partnership with our customers and do our best not to force obsolescence on them. Because we have in-house manufacturing capabilities, it is easier to push back the obsolescence date if necessary, especially for low cost and high volume products where higher stock holdings are less of a risk.

> **"The second rule of obsolescence is transparency; letting people know what to expect and giving them enough time to put contingency plans in place."**

When we can't avoid obsolescence - often because of regulations - we try to give as much warning as possible to our clients, offer backwards compatible replacements and last time buy whenever we can. The second rule of obsolescence is transparency; letting people know what to expect and giving them enough time to put contingency plans in place.

When products you buy in become obsolete, what would you say is the biggest headache and how do you manage it?

Electronic components have some of the shortest lifecycles in industry. Although we don't make electronic components ourselves, we do use them in our machines and products.

When electronic components become obsolete, we need to judge the cost of replacing them, how difficult they are to substitute and whether we can get a backwards compatible version of them. Often, it means we have to alter our products a little, change other components or, for example, modify resistor values. Another strategy is to compile a stock of the component becoming obsolete. This buys us some time while we're doing the redesign. When we're talking about low value electronic components, which can be stored for five to seven years in inert atmospheres and still work, it's worth investing in stock. This gives you peace of mind while working on a product change.

This is why it is so important to receive enough warning when making a product obsolete.

"This is why it is so important to receive enough warning when making a product obsolete. Ideally, a good notice period is twelve months, with last time buy of a significant quantity."

Ideally, a good notice period is twelve months, with last time buy of a significant quantity. The electronics market is particularly fast-moving so, unfortunately, this type of notice isn't always possible.

Do you have any final thoughts on obsolescence management?
I think companies should look at obsolescence as evolution, especially when it comes to large capital equipment. There is not much point in changing to a new generation of products or machines just for the sake of changing. An upgrade needs to result in clear improvement for all parties.

Finally, the aim is to work with suppliers and customers to help manage obsolescence by planning ahead to minimise risks and costs. Whether it is by giving longer notice periods, upgrade offers, a repair and replace service or just better overall communication, the aim of the game is not quick profit; it is building lasting industry relationships.

Software obsolescence: a risk to security and performance

COPA-DATA is an industrial automation software specialist headquartered in Austria. Its product family, zenon, is used in a range of industries from automotive to pharmaceutical.

Here, Martyn Williams, managing director of COPA-DATA UK, talks to us about how software obsolescence is viewed in the automation industry.

What's your experience of obsolescence in the automation industry from a hardware and software point of view?

Often people can overlook the importance of software obsolescence in the automation industry because it's not seen as a physical risk. For example, if a piece of hardware breaks down, there is a tangible object that can be replaced. However, software obsolescence is a bit more of an abstract concept.

Sometimes there can be a lack of understanding when it comes to the value of a software upgrade, but just as a PC's performance will degrade over time, so too will software performance dwindle if not upgraded.

How is hardware obsolescence different from software obsolescence?

There is often a higher level of fear involved in upgrading software compared to hardware. Software can be seen as a black box where no one knows what actually takes place. If there are programmed elements, who wrote them? Who documented them?

This often leads to manufacturers going down the route of sticking with what they know for fear of upsetting the balance. Unfortunately, this is seldom the best choice.

Please tell me a little bit about the risks of obsolescence in the industrial software market

Like anything, performance of software will decrease over time unless managers invest in improving overall lifespan by conducting regular updates. New security standard updates are by far the most important. These need to be implemented to ensure assets are protected from cyber threats.

Unfortunately, manufacturing companies tend to stick with software versions they are familiar with, even if they're not supported by the manufacturer, or even developer, anymore. Obsolete software leaves organisations wide open to security breaches, because software companies stop creating patches to known vulnerabilities in obsolete software.

“Obsolete software leaves organisations wide open to security breaches, because software companies stop creating patches to known vulnerabilities in obsolete software.”

As a software manufacturer, how does COPA-DATA manage the obsolescence of its software and the impact it might have on clients?

We specially design our industrial automation software with usability and future-proofing in mind, so as to take away software upgrade risks.

Every COPA-DATA software upgrade will integrate the previous version, ensuring a seamless upgrade process and complete backwards compatibility. Our focus on parameterising instead of programming, makes it easy for customers to see how the product is configured, allowing for an easier transition when the hardware does need updating.

COPA-DATA has an endless quest to achieve product excellence. We ensure the latest versions of software always work with new technologies and updated operating systems, whilst maintaining the software's backwards compatibility with earlier versions.

What do you think obsolescence will look like in Industry 4.0?

The amalgamation of IT into the manufacturing sphere already means software obsolescence issues are better managed; they are now taken into the IT procedural control. With the increase of intelligent, highly interconnected devices in the manufacturing industry, it can only mean better management of software obsolescence in the future.

Program and OS software will update automatically, meaning there is less chance of hackers exploiting known security issues.

What are your top tips for managing software obsolesce within an industrial automation system?

Planning ahead is key. Having a dedicated IT team that recognises the value of software integrity, knows when updates are available and what they contain, is imperative for keeping your automated manufacturing system running smoothly and securely.

If a new version of software is released, you have to analyse the risk not updating will have on your system. A few days of planned disruption during the upgrade is a lot better than a system brought to its knees from unreliable software with known security weaknesses.

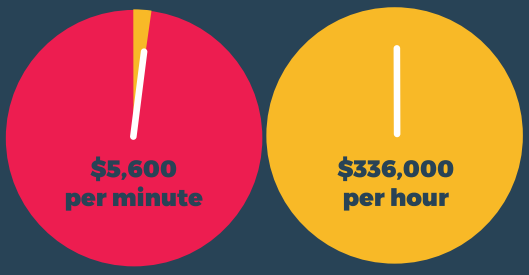
Cost of downtime

Data centres

- **$7,900 per minute**
  Average cost of data centre downtime
- **86 minutes**
  Average reported incident length
- **$690,200**
  Average cost per incident

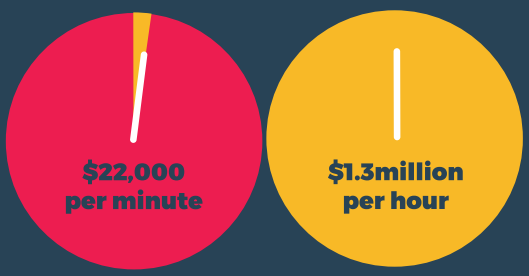
IT Network Downtime

- **$5,600 per minute**
- **$336,000 per hour**



Automotive Industry

- **$22,000 per minute**
- **$1.3million per hour**



Three ways of preventing downtime

- **Preventative maintenance**
- **Stock spare parts**
- **Obsolescence management**

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The obsolescence dictionary

Creating a mini dictionary of words and phrases associated with obsolescence, when dictionaries themselves are becoming obsolete might seem a bit ironic, but it's certainly beneficial. The vocabulary on the topic is constantly increasing, but here is a list of the main contenders.

Commercial off-the-shelf (COTS)
The purchase of products that are standard manufactured products rather than custom made.

Computerised maintenance management systems (CMMS)
Systems that help companies manage infrastructure. They enable alerts for new software updates, manage records of where spare parts are located or calculate the cost of breakdown repair versus preventive maintenance for each machine.

Data decay/degradation/rot
Gradual decay of storage media. This can refer to solid-state, optical, magnetic and paper storage mediums.

Diminishing manufacturers sources and material shortages (DMSMS)
Whereas obsolescence refers to a lack of availability due to statutory or process changes and new designs, DMSMS is a lack of sources or materials.

Eco Obsolete Technology
Obsolete devices that meet current industry energy efficiency standards.

End-of-life (EOL) product
A device supplied to customers with the indication that the vendor intends to stop marketing, selling or supporting it.

International Institute of Obsolescence Management (IIOM)
Professional body dedicated to helping industry professionals worldwide understand and manage obsolescence. Find out more at www.theiiom.org

Last time buy (LTB)
A warning from original equipment manufacturers to customers that a product is becoming obsolete and it's the last chance to buy it from that supplier.

Legacy system
A technology, computer system, or application program considered outdated.

Planned obsolescence
A business strategy in which a product is designed to become out-of-date or no longer functional within a known period.

Product lifecycle management (PLM)
Process of managing the entire lifecycle of a product from inception, through engineering design, manufacture, service and disposal.

Product obsolescence
The state in which a piece of technology or product ceases to be manufactured. Product obsolescence may occur when a company stops producing, marketing or supporting a sold or developed product.

Technological obsolescence
The state in which a product is no longer technically superior to other similar products, which can make it no longer wanted or needed.

EU Automation will feature an online version of the obsolescence dictionary on its website www.euautomation.com, so if you think we need to add anything to the existing list of terms and phrases, please e-mail us on bookofobsolescence@euautomation.com.

Chapter 4:
Sticking to standards

The legislation obstacle course

Constantly changing industry legislation can be a tricky thing to tackle for manufacturers. Regardless of whether we are talking about strict sector regulations for process industries, such as pharmaceuticals, or widely applicable changes to energy efficiency, product testing or obsolescence, complying with the latest legislation has always felt like running an obstacle course. The race gets even more complicated when it comes to an international regulatory landscape.

If we take the example of energy efficiency, it's easy to see how countries around the world are regulated by different legislation.

In EU countries, consumer and industrial products need to be designed and manufactured according to the Ecodesign Directive. This legislation aims to reduce the amount of inefficient equipment on the market. Among other things, it encourages the use of more efficient electric motors and the phase out of incandescent lighting.

"If we take the example of energy efficiency, it's easy to see how countries around the world are regulated by different legislation."

Another important EU regulation is the Energy Efficiency Directive, which has been adapted to individual EU countries. In the UK, for example, the Energy Savings Opportunity Scheme (ESOS) dictates mandatory energy assessments for large companies.

Organisations that qualify for ESOS must carry out energy efficiency assessments every four years. These assessments are audits of the amount of energy used by buildings, industrial processes and transport to identify cost-effective energy saving measures.

Industrial equipment and systems used in sectors such as pharmaceutical manufacturing and nuclear are subject to even more stringent regulations. Upgrading industrial automation equipment in these sectors comes with reams of paperwork, whereas like-for-like replacements can often be implemented as needed.

Legislative change in industry happens fairly quickly. One minute a piece of kit is relevant and the next it is obsolete. The thing to remember is that obsolete doesn't mean useless. There are many ways of prolonging the life of obsolete equipment, while also complying with the latest industry regulations.

In this chapter, we look at the legislation and standards affecting industrial automation and share our tips for how manufacturers can continue to compete in the legislation race. We also discuss continuous improvement and ways of turning red tape into a competitive advantage.

Energy efficiency today and tomorrow

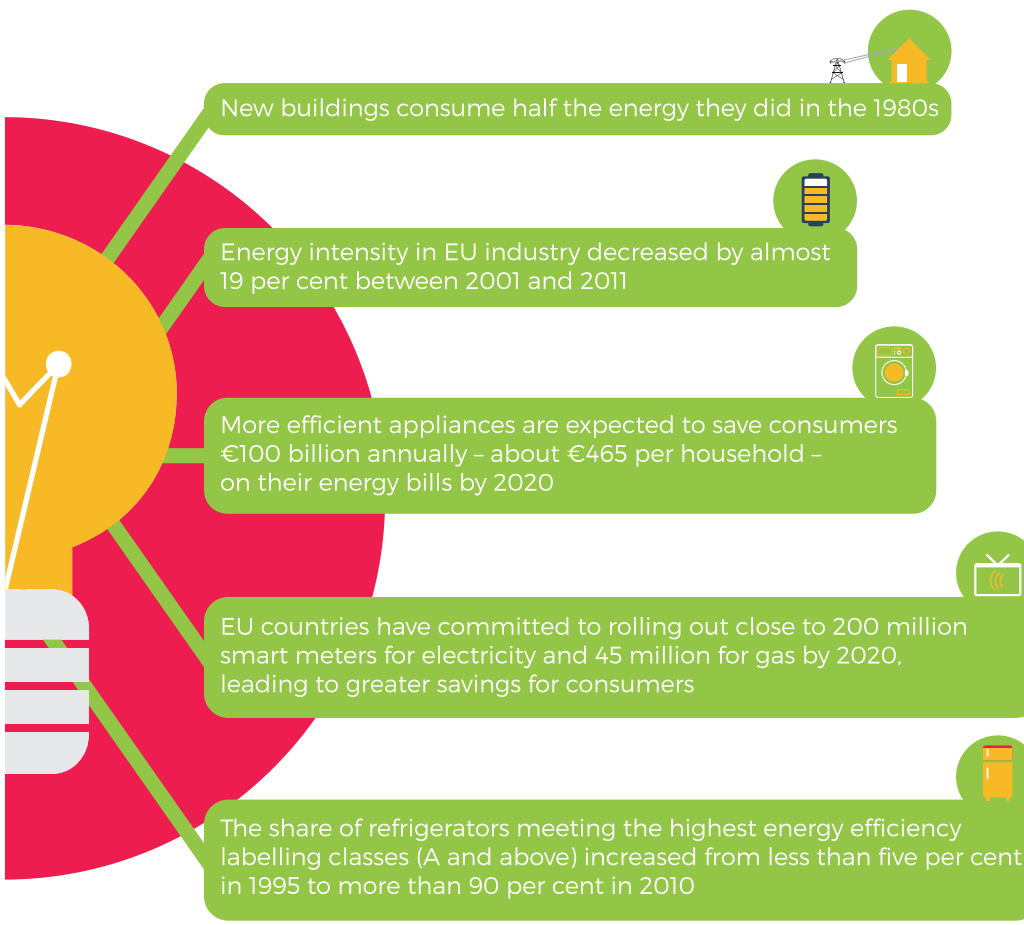
Energy efficiency regulations are a driving force behind obsolescence. They have left many an electric motor trailing in their wake as industry strives to become more sustainable.

For companies in the European Union (EU), the Energy Efficiency Directive (EED) stipulates overarching energy efficiency guidelines. The Energy Savings Opportunity Scheme (ESOS) is the UK response to the requirement for all member states of the EU to implement article eight of the EED.

EED

The 2012 EED establishes a set of measures to help the EU reach its 20 per cent energy efficiency savings target by 2020. Under the Directive, all EU countries are required to use energy more efficiently at all stages of the energy chain from its production to its final consumption.

The EU's drive towards a more energy efficient future has already produced substantial benefits:



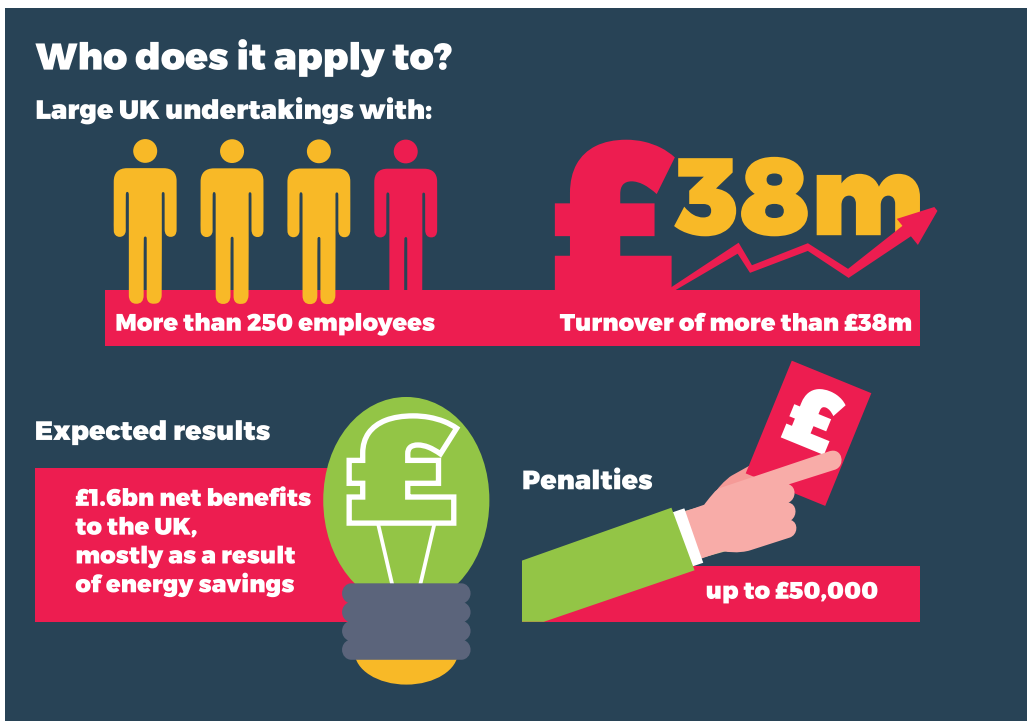
ESOS

ESOS is a mandatory energy assessment and energy saving identification scheme for large companies in the UK. The directive is estimated to lead to £1.6 billion net benefits to the UK - that's the cost of running just over 1.2 million standard light bulbs for a year.

ESOS has three phases with a four-year completion period at each stage. The first is an initial record of energy usage across the board - systems, infrastructure, production and transport. Next is an audit of these elements to identify cost-effective energy efficiency plans that the company can feasibly implement. Thirdly is reporting these to the Environment Agency.

Using this self diagnostic process, large companies can devise and implement energy efficiency strategies to reduce running costs and help contribute to lowering the UK's carbon footprint.

ESOS and the Ecodesign Directive are just two of the latest regulations for industry that support the international movement towards more efficient energy usage and a more sustainable way of doing business.



The Ecodesign Directive

Did you know that Argentina, Australia, Brazil, Columbia, Cuba and Mexico have prohibited the use of the incandescent light bulb? Furthermore, Canada, China, the European Union and the United States are in the process of phasing it out too. Why, I hear you ask? Because they don't meet the modern energy efficiently legislation applicable in these territories.

For countries in the European Union, the Ecodesign Directive ensures wasteful electrical products are gradually being replaced by more energy efficient ones. This includes the wasteful incandescent light bulb and both consumer and industrial devices.

One area of the Ecodesign Directive that industry should pay particular attention to refers to regulations targeting electric motors.

The International Electrotechnical Commission (IEC) has an internationally applicable testing Standard IEC 60034-2-1 for electric motors and a classification scheme IEC 60034-30-1 with four levels of motor efficiency:

- IE1 standard efficiency
- IE2 high efficiency
- IE3 premium efficiency
- IE4 super premium efficiency

The IE code and its efficiency levels create a basic guideline for governments to determine the efficiency level for their minimum energy performance standards (MEPS). Many countries use their own national test standards while also referencing the international test Standard IEC 60034-2-1.

From June 2011, all motors sold on the EU market had to fall within the scope of the standard IEC 60034-30 and be at least IE2. This automatically made IE1 motors obsolete. From January 2015, motors rated from 7.5 to 375 kW had to be IE3 or be IE2 and installed with a variable speed drive (VSD).

The consequence is that motors that fail to meet IE3 standards must be retrofitted with an appropriate VSD or face the bin of obsolescence. Finally, the same requirement will be extended to motors in the range 0.75 to 7.5 kW in 2017.

Industrial plants using older motors in the EU need to ensure that they are up to scratch when it comes to efficiency standards. Similarly, industrial equipment that is not energy efficient, such as the incandescent light bulb, is slowly being phased out, so manufacturers need to make sure they keep up to date with these changes or risk hefty fines.

Minimising interference

Cherry Clough is an independent consultancy that helps manufacturers, installers and users manage issues associated with electromagnetic interference, such as compliance with EU Directives and similar regulations.

Here, we speak to CEO Keith Armstrong about obsolescence and electromagnetic compatibility (EMC).

To start off, why is EMC important in industry?

Although some people in industry think EMC is only important due to laws and regulations, such as the EMC Directive in Europe, in fact it is really about achieving reliable operation and adequate uptime percentages.

For manufacturers and installers, the main concern is reducing warranty costs, improving the market perception of their products and minimising the risk of liability claims for lost production and health and safety.

What is your experience of product obsolescence in industry and the way it can affect EMC?

Product obsolescence has EMC implications when individual components of a system are replaced. For example, a replacement programmable logic controller (PLC) board would almost certainly use more modern microprocessors, memory and Field Programmable Gate Array (FPGA) integrated circuits (ICs), which are likely to have higher EMC emissions (which can cause interference) and worse EMC immunity, especially at higher frequencies.

When replacing an entire computer, PLC or motor drive with a new or refurbished model its new EMC installation instructions may require changes.

Replacement products should carry the CE marking and come with copies of their manufacturers' EU Declarations of Conformity to the EMC Directive.

However, these certifications do not guarantee equipment won't cause or suffer interference and do not provide a legal "due diligence" defence (at least, in the UK) if a customer should sue for providing equipment that caused lost production or safety hazards because of a lack of EMC

"Replacement products should carry the CE marking and come with copies of their manufacturers' EU Declarations of Conformity to the EMC Directive."

Even when new products really do comply with their EMC standards (many do not) and are installed correctly, at higher frequencies they will probably have higher emissions and lower immunity than what they replaced. This can mean that legacy equipment could cause the new products to suffer interference, or suffer interference from the new products, even though the original products did not.

Are EMC issues becoming more prevalent with shorter product lifecycles in the electrical industry? What's the reason for this?

Shorter lifecycles are caused by designers using newer ICs and power switching devices to add new features, in a never-ending quest to maintain or grow market share.

“Shorter lifecycles are caused by designers using newer ICs and power switching devices to add new features, in a never-ending quest to maintain or grow market share.”

As I said earlier, this generally results in worse emissions and immunity than their predecessors, even when they comply with their relevant EMC standards. So yes, EMC issues are becoming more prevalent.

What are your top recommendations for mitigating EMC problems in a system when a part breaks down?

Firstly, it is important to ensure that replacement equipment really does comply with the EMC Directive, using methods described in guides for good EMC practices for equipment and installations, for example those available from www.reo.co.uk/technical_resources.

However, even when using replacement equipment that really does comply with its EMC emissions and immunity standards and is installed correctly for modern EMC, this cannot guarantee it won’t cause or suffer interference with other equipment. This needs to be understood so that companies can properly manage all their financial risks during design, implementation, operation and maintenance.

Secondly, correct installation is very important for the EMC of modern electronic and power conversion equipment.

Finally, it may be necessary to deal with problems that arise because legacy equipment is not EMC compliant. Products may once have been compliant, but are no longer because of aging, corrosion, wear, use/misuse, modifications, or incorrect installation. Or it may be so old that it has never complied.

Chapter 5:
Managing obsolescence

On the upside

In the previous chapter, we looked at regulations, standards and legislation that cause products to become obsolete. However, it's not all doom and gloom. Obsolete devices play a crucial role in critical applications if managed correctly.

Dealing with obsolescence is all about meticulous planning. If you have a large facility or plant, obsolescence management can be a full time job. Luckily, this is why we have obsolescence managers.

“Supplementing a system with a like-for-like replacement instead of commissioning an upgrade, not only saves on maintenance costs, but also minimises downtime.”

Obsolescence doesn't have to be a logistical nightmare and can be used to your advantage to keep critical applications up and running.

Furthermore, by continuing to use parts no longer made by the OEM, you are actively minimising the amount of scrap going to landfills. When you do decide to get rid of obsolete components, make sure you choose an environmentally friendly method, such as a service exchange or repair service.

However, perhaps the greatest advantage of taking a proactive approach to obsolescence management is the potential for cost saving. Supplementing a system with a like-for-like replacement instead of commissioning an upgrade, not only saves on maintenance costs, but also minimises downtime.

Peaked your interest now? Take a look at this chapter for ideas about how you could put together an obsolescence management plan that suits your company’s needs.

There's method in the management

Obsolescence management describes the process of identifying risks and planning preventative actions when parts, spares, equipment, people and software become obsolete. It is impossible to stop things becoming obsolete, but it is possible to mitigate the risks to production when they do.

The basis of obsolescence management relies on life cycle forecasting and other analysis to identify the impact of obsolescence to a system through all stages of a product's life cycle.

Large or small, companies that invest in obsolescence management tend to find different methods that suit them.

This could involve hiring an obsolescence manager, employing the services of a third-party specialist, purchasing a computerised maintenance management system or asset management system, or simply using spreadsheets to keep records of product lifecycles.

Essentially, by taking the time to assess systems and predict which components may need replacing, you can stay ahead of the game and have a solution ready at all times.

This will reduce downtime, save money and uphold your company's reputation.

Whatever method, obsolescence management boils down to these essentials:

- **Assess current systems and supply resources**
- **Conduct risk analysis on all components**
- **Prioritise risk**
- **Stockpile obsolete spares**
- **Record lead times for supply**
- **Ongoing review**

Obsolete? No problem

Rochester Electronics is an authorised manufacturer, stockist and distributor of semiconductors that have become obsolete. Semiconductors are the foundation of modern electronics; without them, there would be no electronic equipment.

What people used to think of as obsolete years ago is not the same as today. In terms of electronic components, mature technologies have ongoing critical needs in long-term applications.

Here, we talk to business development and technical consultant Peter Marston about obsolescence in the industrial electronics sector.

Please tell me about how the work of Rochester Electronics ties in with obsolescence and product lifecycle management.

Rochester Electronics is particularly important to the segments of the electronic equipment industry where there is a lengthy in service operation of devices, which could be in excess of 30 years. The reason is that many original manufacturers only support the semiconductors they make for a short period - less than five years. Without Rochester's support, equipment manufacturing and maintenance of semiconductor requirements for long life electronic applications would probably be unobtainable.

To keep equipment in operation requires an alternate support solution that can be costly. This opens up the opportunity for counterfeit and fake device suppliers. We believe that currently over one per cent of all semiconductors being sold are counterfeit. Furthermore, reports of counterfeit devices indicate that around 60 per cent are types than have been discontinued by the original manufacturers.

What are the changes you have noticed in product obsolescence cycles over the last few years? Would you say they are shorter or longer?

Semiconductor manufacturing life has reduced over the past 30 years.

Many device types introduced in the 1970s and 1980s were in production for 25 to 40 years. Today, because semiconductor manufacturers are driven by the needs of the consumer market, a device's production life can be as short as two years. Overall, the typical lifecycle for electronics today is less than five years.

“Over one per cent of all semiconductors being sold are counterfeit. Furthermore, reports of counterfeit devices indicate that around 60 per cent are types than have been discontinued by the original manufacturers.”

Legislation also impacts the semiconductor manufacturing lifecycle. The Waste Electrical and Electronic Equipment (WEEE) and the Restriction of the Use of Certain Hazardous Substances RoHS directives, for example have banned the use of certain materials.

All of these factors are contributing to shorter product obsolescence cycles.

What are the main risks that obsolescence brings to the electronics industry? How are these risks changing with the rise of counterfeiting?

The lack of an ongoing supply of semiconductors forces the manufacturers and operators of long-life electronics systems to find alternate solutions to keep equipment production and operation going. Redesign and use of alternate products may be a suitable solution in certain applications, but those of a safety critical nature - such as avionics, medical, nuclear, military, transport, automotive and communications - will incur expensive requalification costs.

In some cases, these requalification costs will be in the tens of millions of pounds. Furthermore, in many applications redesign or use of alternate products may be unacceptable to users because it causes spares and equipment logistics problems.

This short-term supply of semiconductors from the original manufacturers opens up opportunities to counterfeiters. Counterfeit and fraudulent semiconductors come from waste recovery, scrap reclaim, shipment theft, intellectual property theft and cloning of device which may contain Trojans. Some may function on receipt but are likely to fail prematurely or cause applications to malfunction.

How do you see obsolescence changing, if at all, with the rapid advancements in the electronics?

There are several factors in the semiconductor manufacturing industry that are making obsolescence a more prominent issue: buyouts and mergers of semiconductor manufacturers, the increasingly high cost of installing and running state of the art silicon foundries, rationalisation of package styles, reduction of assembly and testing subcontractors and finally, a growing number of fabless semiconductor manufacturers. Fabless manufacturing is the design and sale of semiconductors while outsourcing the fabrication of the devices to a specialised manufacturer.

We believe that without the support of companies like Rochester Electronics, long-life electronics equipment manufacturers will struggle to support their user needs.

What are your top tips for managing obsolescence when it comes to industrial electronics?

Industry needs to understand that semiconductor manufacturers that have their own production facilities have better control of obsolescence and product retirement. Choosing a legitimate source of semiconductors at the equipment design stage is a key factor for industrial electronics intended to have a long production and operational life.

“Choosing a legitimate source of semiconductors at the equipment design stage is a key factor for industrial electronics intended to have a long production and operational life.”

Top tips for managing product obsolescence

Traditionally, original equipment manufacturers had a lot more control over their product cycles than they do today. In the days of proprietary software, this control partly came from the fact that manufacturers provided the whole package - from hardware to software. Lean manufacturing has changed things and OEMs started relying on a range of suppliers to produce components for their final product.

So how can OEMs ensure their products are supported for a number of years, sometimes even after they become obsolete?

The first tip is to choose suppliers wisely and ask relevant questions, including:

- **What makes you an expert in your field?**
- **Do you have manufacturing capabilities and if so, how flexible are they?**
- **What is your track record for supporting products?**
- **Do you have any supporting documentation for your track record?**
- **What do you foresee changing the industry in the near future?**

This comes with its own risks if not managed properly, especially when a component becomes obsolete.

Having reliable suppliers with a proven record of accomplishment for supporting products is essential for any company developing new products. The last thing OEMs want is to find themselves in a scenario where they are handed a last time buy (LTB) notice before the product has even gone live. It might sound ridiculous, but it has been known to happen.

Research and planning are on a par with trustworthy suppliers. Knowing your industry and the trends that go with it, as well as the latest tech developments, could be the difference between a product that lasts five years and one that lasts less than twelve months before it becomes obsolete.

Generally speaking, customers prefer not to be given an end-of-life (EOL) notification when buying a new product. No one wants to feel like they have been duped into spending big on what they perceive to be outdated stock.

Above all, when the time does come to obsolete a product, give as much notice to customers as possible. This ensures they have time to order a surplus if needed and set up a maintenance plan.

Tried and tested

Megger designs and manufactures test instruments that perform electrical measurements for preventative maintenance, troubleshooting and commissioning.

Here, we talk to Megger's marketing director, Bryan Phillips, about the company's experience with obsolescence.

Could you please tell me about Megger's experience with obsolescence?

As you might imagine, designing robust electronic goods that will be in service for a number of years is a difficult feat. We try to work on - or just behind - the leading edge of device technology, so that we can gain from a chip manufacturer's lifetime plans. However, we are also conscious of not working too close to the leading edge, which might result in application problems or even supply problems in the early life of a product.

How does Megger minimise the effects of obsolescence for the products it manufactures?

Planning and preparation are key. Megger monitors obsolete components on a regular basis. We review regularly with product managers and assess supply chain involvement on a monthly basis. We also plan for product lifecycles upfront to ensure an accurate vision of projected need. Finally, we also plan for servicing products not only during, but also after trading cycles.

> **“We are also conscious of not working too close to the leading edge, which might result in application problems or even supply problems in the early life of a product.”**

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More and more businesses in industry are using obsolete technology to keep critical applications running. Have you seen this reflected in the demand for testing equipment as managers look to source spares rather than upgrade?

Our specific test equipment is designed to test, measure and validate. It is primarily used in fault-finding or periodic testing. Engineers and facilities managers can use our equipment to ensure systems using obsolete parts are running as they should.

As for obsolete Megger products, there are requests for older models to be maintained many years after we have stopped manufacture. However, new technologies give us the ability to provide additional features in new designs, allowing us to ensure better testing products.

With increasingly smart Industry 4.0 ready technologies employed within industry, how do you see the role of testing equipment evolving?

In-built testing functions within equipment may well become bigger in the future. This will be useful to an extent, but without the additional intelligence to diagnose, it remains an indicator rather than a tool for ensuring safe and efficient working of electrical circuits and equipment.

Will you remember?

Nexus GB is an industrial memory manufacturer, specialising in rugged industrial memory used in defence, medical, food equipment, heavy industry sectors and more.

Here, we ask its managing director, Michael Barrett, about how obsolescence affects customers and manufacturers in the industrial memory market.

What's your experience of obsolescence when it comes to industrial memory?

On numerous occasions, we've seen companies use secure digital (SD) cards as the source of memory in their products, only to be given a last time buy (LTB) notice from their memory supplier weeks before the product goes live. In cases like this, the product is already suffering from obsolescence before it's even hit the shelves.

In such situations, the manufacturer has to choose between trying to estimate how many cards it will need and buying in bulk, or redeveloping the product entirely.

In sectors such as medical or military, a redesign would mean getting the product reapproved by the appropriate bodies. As you can imagine, this process is very costly, takes a lot of time and there's a chance other components could become obsolete during the wait.

“The main risk of obsolescence comes when industrial companies use memory designed for a consumer market, such as the good old USB memory stick.”

Military and medical devices probably have the longest lead time from the initial design to the product going live and products are expected to be in the field for a long period of time, so forward planning is a must.

Please tell me a little bit about the risk of obsolescence when it comes to industrial memory.

The main risk of obsolescence comes when industrial companies use memory designed for a consumer market, such as the good old USB memory stick. Unfortunately, this is a mistake many companies make.

Think how quickly your smartphone becomes outdated; consumer memory is not developed with an industrial market in mind, it has constantly changing standards and upgrades. Within industry, there is a need for longevity that consumer memory simply cannot fulfil.

Can you tell me a little bit about digital decay and how it affects industry?

Memory lying dormant and unused within a product is vulnerable to digital decay, given 10-15 years. This is all the more common with large memory devices that go for long periods of time unread and unwritten. The smaller memory drives that we supply, get rewritten and read a lot more due to their size and so digital decay isn't as prevalent an issue.

Companies sticking with the same industrial memory for a number of years should ensure it is used regularly to ward off digital decay. In larger organisations this might even be written into a routine maintenance procedure.

> **“In the consumer world I think the cloud will probably make physical memory obsolete, perhaps even in the near future.”**

Do you think cloud computing will make physical memory obsolete?

In the consumer world I think the cloud will probably make physical memory obsolete, perhaps even in the near future. Whereas in industry, I think it will take decades for wide scale adoption of the technology.

The Internet of Things (IoT) has promised to be a game changer, but we haven't seen much delivery so far. Once this concept truly takes off, we might see more uptake of the cloud in industry. At this current time, the benefits don't outweigh the cost implications though.

There's also the issue of security. Nexus GB supplies industrial memory to the defence sector and knows first-hand cloud networks are usually not an option because of the security implications. This is a very real fear and defence isn't the only sector worried about this issue.

What are your top tips for managing obsolesce with regards to industrial memory?

As well as steering clear of consumer memory, manufacturers need to ask their suppliers lots of questions before developing a new product. What's their track record for supporting products? Can they provide proof? What do they foresee with regards to changing standards? Is the supplier an expert in their field?

It all boils down to manufacturers being diligent with their suppliers and planning ahead.

All in it together

Obsolescence does not discriminate; it affects all industrial systems in a variety of industries. Planes, trains, plants, data centres, power stations - you name it, obsolescence has touched it.

It is therefore unsurprising that we have groups such as the International Institute of Obsolescence Management (IIOM) and the Nuclear Utility Obsolescence Group (NUOG), dedicated to helping companies manage obsolescence.

> **“In some ways, obsolescence has the effect of bringing manufacturers and end users closer together.”**

One of the aims of these trade bodies is to cultivate a collaborative environment where both suppliers and end users can discuss the challenges they face from obsolescence. Furthermore, companies can share mitigating techniques or strategies.

For example, by partnering with another industrial plant that has the same obsolete devices, companies share costs when purchasing bulk lots of components on last time buy (LTB) notices.

In some ways, obsolescence has the effect of bringing manufacturers and end users closer together. The main aim is to keep plants operating as efficiently and cost-effectively as possible, because when businesses close, nobody wins.

For an OEM, careful planning and scrutiny of component suppliers is essential to ensure customers are getting a product that will be fully-functional and supported for years to come. This is especially important for those industries in which systems are most likely to be several decades old - like nuclear or heavy industry.

For innovation to prevail, obsolescence has to exist as a necessary evil - there is no way of eliminating it from the equation completely. However, by working together, industry, governments, trade bodies and consumers can help minimise the effects of obsolescence.

Chapter 6:
The sustainability race

Your old new best friend

It is fair to say that the term obsolete often conjures up negative connotations, especially in the world of engineering and technology. Many industry experts associate obsolete devices with expense, downtime and maintenance headaches. Overall, obsolete technology gets bad street reputation it doesn't deserve. Let us tell you why.

Energy efficiency standards have become an increasingly important aspect of industrial operation. Whether it's an ISO 50001 qualification, conformity with the European Ecodesign Directive or an EU Energy Efficiency Directive audit, energy usage is at the forefront of many plant managers' minds.

Despite what you might think, obsolete parts can help soothe efficiency worries.

Eco obsolete technology (EOT) is the name used for devices that are no longer manufactured or supported by the original equipment manufacturer, despite still living up to current energy efficiency standards.

This means there is no need to make those costly systems upgrades if the obsolete technology you are using is sufficiently green. Great news, right?

This chapter discusses EOT in more detail and how the technology can help you be more energy efficient.

Eco Obsolete Technology - how does it work?

So far, we have discussed how regulations are a driving force behind industry obsolescence, paying a close look at energy efficiency regulations. Industry has a responsibility to become more sustainable and so it is hard to dispute energy efficiency directives, even if they mean reconsidering critical production systems.

Fortunately, Eco Obsolete Technology (EOT) is allowing companies to remain compliant without the need for expensive redesigns.

If you are a plant manager conducting an energy audit and you find an electric motor that is highly inefficient and not compliant with energy regulations, you have two options.

> **"Eco Obsolete Technology (EOT) is allowing companies to remain compliant without the need for expensive redesigns."**

You could upgrade the motor and risk overhauling other parts of the system to ensure compatibility; or you could go for an easier, quicker and cheaper option.

By sourcing a compatible variable speed drive (VSD) and retrofitting it to the motor, you will reduce the application's energy usage and comply with energy efficiency regulations.

On January 1, 2015, in accordance with the second phase of the European Ecodesign Directive, motors rated between 7.5 and 375kW either had to be replaced with IE3 efficiency level models, or meet the previous IE2 level and be fitted with a VSD.

By January 1, 2017, all motors must meet IE3 efficiency standards, or IE2 in combination with an VSD.

Consequently, motors that fail to meet IE3 standards will become obsolete unless retrofitted with an appropriate VSD. If you have an older motor, finding an OEM to supply a compatible VSD is a tough challenge. However, sourcing an obsolete device to regulate motor speed is an economical and efficient option of adhering to energy regulations. This is EOT at its finest.

It just goes to show that with increasingly stringent energy efficiency regulations, not all obsolete parts will be swept away in the quest for a greener future. In fact, some can even help a company comply with requirements.

Eco Obsolete Technology

EU Automation is an industrial automation spares supplier that delivers new, repaired, reconditioned and obsolete parts to companies around the world. In 2015, EU Automation coined the phrase Eco Obsolete Technology (EOT).

Here to tell you more about what EOT means is our sales director, Darren Halford.

What is EOT?

There is an old adage in Britain that goes "if it ain't broke, don't fix it." It means you shouldn't tamper with things if they are running smoothly. If we want innovation to prevail, this proverb shouldn't be taken literally. Although it might seem counterintuitive, sometimes the best option is to maintain the status quo. This is often also the most cost effective solution.

Eco Obsolete Technology refers to any device, component, part or machine that is no longer produced or supported by the OEM, but still adheres to energy efficiency regulations. In short: energy efficient obsolete technology.

How did the term EOT come about?

In 2015, EU Automation coined the phrase because we felt there was a worldwide misunderstanding and under appreciation of obsolete parts in industry. We wanted to raise awareness of the importance of obsolete parts in the everyday running of critical applications across a wide range of industrial sectors.

“Eco Obsolete Technology refers to any device, component, part or machine that is no longer produced or supported by the OEM, but still adheres to energy efficiency regulations. In short: energy efficient obsolete technology.”

“A costly upgrade isn’t the only way to become more energy efficient.”

Industry regulations that aim to increase energy efficiency are getting stricter around the world. If I continue down the proverbs route, "between a rock and a hard place" best describes the situation a lot of manufacturers are finding themselves in.

Companies need not panic. A costly upgrade isn’t the only way to become more energy efficient.

Companies should keep in mind that when retrofitting industrial parts into a system, there's always a chance that replacements could already be obsolete. So you start to see how EOT becomes a part of the wider industrial landscape.

Why is EOT important?

More and more sectors are relying on obsolete parts to keep the lights on. Devices in heavy industries, nuclear and defence - to name a few - are built to last for decades. It's therefore understandable that OEMs won't be making the same model 40 years down the line.

If you work in heavily regulated industries, you'll understand the necessary red tape when implementing upgrades. In most cases, sourcing a like for like replacement is the easiest option and will get production up and running the quickest.

EOT ensures systems and processes are energy efficient and compliant, but on a far more basic level, it enables many industries to survive.

What do you think the future holds for EOT?

Sustainability and energy efficiency are incredibly important world issues, let alone industry issues. Both are only going to become more prevalent in the future. As more and more industrial parts become obsolete before they've lived their useful life and energy efficiency standards become more stringent, implementation of EOT will become more commonplace.

Furthermore, EOT fits into this idea of the circular economy - championed by Ella Macarthur and her eponymous foundation. Businesses are already starting to adopt this waste-reducing production method - not just for sustainability reasons - but financial ones too. In a future where natural resources will dwindle, using reconditioned parts will become the norm.

What goes around...

In the natural world, sustainability comes easily - it's built into the machine we call nature. Small animals eat plants and bigger animals eat the smaller ones, until you come to the top of the food chain. Everything that is living will die and their bodies will fertilise the earth, giving the plants nutrients to grow so the cycle can continue.

However, traditional industrial processes haven't followed mother nature's example. Industry has long followed a linear system referred to as take, make and dispose. We take raw materials, we make motors, clothes or TVs and then eventually we dispose of them at landfills or incinerators.

Not a great advertisement for the human race, but we are trying to change our wasteful ways.

The circular economy is all about getting the most out of materials and keeping them out of landfills while there is still life left in them.

“Industry has long followed a linear system referred to as take, make and dispose.”

Rising prices of raw materials, increasing populations and greater uncertainty with interconnected global supply chains has forced companies to rethink their processes.

Businesses are now looking at how materials can be re-purposed and products and packaging recycled.

Old car mats can be made into engine components, spent batteries turned into new ones and even turkey entrails turned into bio-fuel.

“The circular economy is all about getting the most out of materials and keeping them out of landfills while there is still life left in them.”

At EU Automation we're not really interested in turkey insides, but the idea of reconditioning spare parts to give them a second life, is our passion.

When an industrial plant closes, it has hundreds, if not thousands of useful working parts - some of these no longer made by the OEM. By purchasing these parts, we can make sure they don't end up in landfill, but help keep another plant's lights on. As one organism dies, another is helped to live - it's the circular economy way.

How to use obsolescence to your advantage

Sustainability

- In the UK alone, industry is responsible for 25 per cent of total CO2 emissions

- A variable speed drive, even an obsolete one, can reduce energy consumption by as much as 60 per cent

- For a 90 kW motor in continuous duty, this can mean savings of over £9,000 per year

Reducing waste

- In 2014 alone, 500,000 electronic components were discontinued

- In the UK, for every 5.9 kg of small electricals purchased in 2012 (the average amount per person), only a fraction of these items (1.8 kg) were recycled

- UK landfills are said to reach their limit by 2018 unless recycling rates improve

Reducing maintenance costs

- The Ministry of Defence commissioned a report from QinetiQ and ARINC as part of its Component Obsolescence Resolution Cost Metrics Study

- The report found average engineering cost for a major redesign was £416,910 when taking a purely reactive approach to obsolescence management

- When taking a proactive approach, the highest maintenance cost was £99,492

Reducing downtime

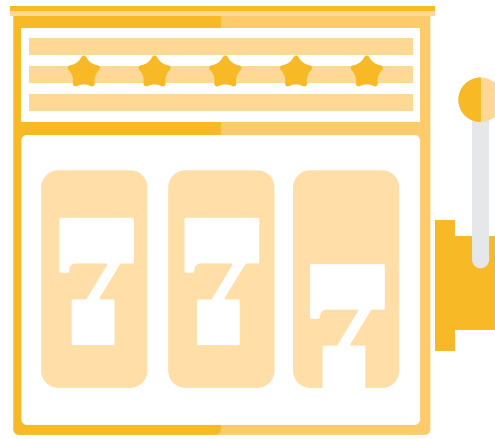
- Everyone in industry has a number they think of when discussing the costs of downtime per hour

- How drastically could these costs be reduced by sourcing obsolete spares the same day?

think of a number

Chapter 7:
Seven steps to obsolescence management

Lucky SEVEN



This chapter sees us near the end of our obsolescence journey, but fear not, like an obsolete motor, we still have a bit more juice left in us.

The previous chapters have been about providing a platform for experts from a variety of industries and backgrounds to display their knowledge. Now, it's EU Automation's turn.

Obsolescence management is a complicated and delicate science that involves significant planning and intricate product lifecycle knowledge.

This is why many large companies hire dedicated obsolescence managers who use specialist computerised maintenance management systems (CMMS) to ensure applications run smoothly.

However, it is not always possible to invest this much time and resources. So what can you do instead?

For those of you wondering where in the world to start when it comes to managing obsolesce, fear not. We have put together a handy seven-step guide for obsolescence management in industrial environments.

“Obsolescence management is a complicated and delicate science that involves significant planning and intricate product lifecycle knowledge.”

Seven steps to becoming an obsolescence master

Initial system audit

Step 1

To effectively plan for the future, you need to be the master of the present and a master is always asking questions:

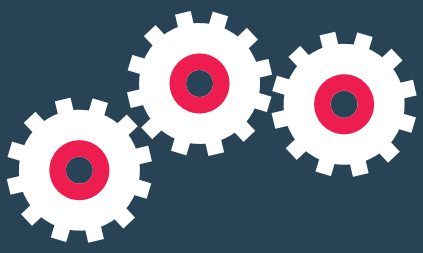
- How old is your machinery?
- How long have the industrial automation parts you are using been on the market?
- Are any components already obsolete?
- Are there software updates available?
  Know your system inside and out, literally.

Know your resources

Step 2

Once you've got to know your plant's working parts more intimately, you need to take a look at your strengths. If a critical part breaks down, you need to be able to call on your resources to minimise downtime. Again, become the master of questions:

- How old is your machinery?
- How long have the industrial automation parts you are using been on the market?
- Are any components already obsolete?



Game of risk

Step 3

Like looking after your most valued customer, the critical applications in your system are where you should dedicate the most planning. Because without them, you are in big trouble.

Draw up a risk assessment form analysing the likelihood of parts breaking down and the effect this would have on the overall system. Ask yourself:

- What is the component's average lifespan?
- If it has moving parts, how worn are they?
- What is the availability from suppliers?
- Can you risk it breaking down or is preventative maintenance the best option?

Go obsolete spotting

Step 4

Make a list of all obsolete parts in your system - these will be the hardest to source. Next, dig deeper. Try to think about the parts likely to become obsolete in the near future - maybe you've had last time buy notices? It might be time to think about squirreling away some spares for these two groups if you're not thinking of a system re-design.

Well-connected friends

Step 5

You've written up your risk assessment, analysed some weak points and decided you need to purchase a spare for that obsolete motor that's been critical in running your plant for 35 years. Trouble is the OEM stopped manufacturing it some time ago.

Working with an industrial automation parts supplier like EU Automation means you are safe in the knowledge that when a part does break down, we have the stock and the contacts to get you obsolete replacements quickly.

Knowledge bank

Step 6

If you have come this far, you will have undoubtedly created lots of notes, records and analytics to keep track of your obsolescence maintenance strategy. This information is invaluable. Collating all this in an easy understandable format, detailing which parts are critical, in need of preventative maintenance or low in stock, could be the difference between minutes or days of downtime.

This doesn't even need to be a fancy system. A relatively small plant can make the most of trusty spreadsheets.

~~Put your feet up~~ Review, fix, update

Step 7

OK, so here's the truth - obsolescence management is a full time job. You can't simply spend one day every six months reviewing processes. It requires daily checks. However, if you keep your maintenance database up to date, life becomes a lot easier. Horrible surprises are minimised and you will start making future predictions like a true obsolescence master.

Go forth my friend and put your learning into practice.
You are a master now.

Obsolescence in the fourth industrial revolution

Many different factors are contributing to the speeding up of obsolescence. Distributed supply chains, rapid technological advancements and the convergence of the IT and industrial worlds are just some of reasons cited for products becoming obsolete quicker.

We now stand blinking in the dawn of the fourth industrial revolution, excited at the promise of interconnected smart futures. But what will this innovation mean for product lifecycles? What will obsolescence look like in Industry 4.0?

> **"By the time most products hit the shelves, better, faster, stronger technologies are already in development."**

To minimise obsolescence risks in their products, OEMs need to thoroughly research suppliers and choose components with the longest predicted lifecycle. This ensures products will remain supportable for years to come. However, this is becoming harder to do with rapid innovations in sectors such as electronics.

By the time most products hit the shelves, better, faster, stronger technologies are already in development.

This trend is only likely to continue as Industry 4.0 comes into full swing and smart devices become more common. However, that's not to say every manufacturer will one day soon move to smart factories.

> **"In the future of Industry 4.0, companies will still need to manage obsolescence."**

In most cases, as is true now, industrial plants will slowly integrate newer technologies into existing systems to augment capabilities. It won't be a revolution, but an evolution as and when potential benefits are identified.

In the future of Industry 4.0, companies will still need to manage obsolescence. However, by harnessing concepts such as big data analytics and cyber-physical systems, obsolescence managers have support from predictive analytics that can diagnose problems, conduct preventative maintenance and order spares themselves. All of this safely overseen by a human operator.

Executive summary

So what's the bottom line? How can obsolescence management benefit your company? **We're glad you asked.**

As you will undoubtedly know, implementing Internet of Things (IoT) enabled devices and technologies into a system, does not happen overnight and is not cheap.

I'm sure everyone would love a brand new control system upgrade - perhaps a highly automated system that provides unrivalled efficiency? It certainly is the dream. However, not all businesses are lucky enough to afford such elaborate redesigns.

For the majority of cases, it's about pacing yourself and planning for the present. Sometimes, when a single part breaks down, the best solution isn't an overhaul, it's replacing the offending part so production can resume as quickly as possible.

There's a time and a place for Industry 4.0 upgrades, normally during planned maintenance windows, not as a knee jerk reaction to a breakdown.

By incorporating obsolescence management into maintenance plans, companies can reduce downtime, negate last minute maintenance costs and save money on expensive upgrades.

Furthermore, using like-for-like replacements instead of new devices means engineers don't have to go through a learning stage - it's still the old systems with the idiosyncrasies they know, love and more importantly, understand.

By putting the right procedures in place - like stockpiling spare parts and building a relationship with an obsolete automation supplier - breakdowns can be managed to have minimal impact on business, allowing the boardroom to focus on growing the company.

The **end**

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About the authors:

Mark Proctor
With a Law degree and twelve years in the industrial automation sector, Mark Proctor knows a thing or two about long and tedious reads. He wanted this book to be a little bit different. As managing director of EU Automation, Mark is the brains behind one of the fastest growing companies in the sector and an expert in international business.

Jonathan Wilkins
Marketing director by day, Jonathan Wilkins is also one of the most prolific Industry 4.0 writers in the industrial automation sector. A professional brand advocate and commercial marketing strategist, Jon has been part of the EU Automation team since its humble beginnings in 2009 and has over a decade of experience in marketing.