CONVERGE
AN ARROW COMPANY

FOM

Future of Obsolescence Management

LOOKING FORWARD

Edition V

09/2017

WELCOME!

We are delighted to invite you to our two global **FOM2017** events in Amsterdam, the Netherlands and Long Beach, California.

What are the **Future of Obsolescence Management** (FOM) events?

FOM is a networking event and a conference, bringing together global experts to discuss the latest trends and best practices in obsolescence management.

The FOM events have been held in Europe since 2015. The format features **short, engaging presentations** with time for questions and a moderated debate at the end of the day. Speakers focus on **sharing expertise and pragmatic, forward-looking solutions.**

Typically a FOM audience comes from the **Aerospace and Defense, Oil and Gas, Industrial and Automation, Medical, Automotive,** and **Transportation verticals**. Delegates all share one thing in common - a passion for solutions and sharing knowledge.

In the following pages you will find the agenda and practical information for both events.

We look forward to seeing you there and writing the Future of Obsolescence Management together!

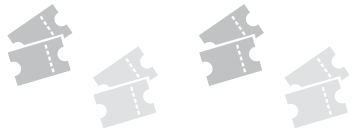
Warm Regards,

The FOM Team

TABLE OF CONTENTS

FUTURE OF OBSOLESCENCE MANAGEMENT

3 YEARS

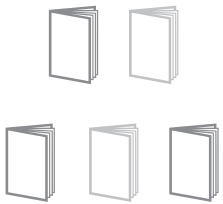


4 EVENTS

25 SPEAKERS

500 ATTENDEES

300 COMPANIES



5 MAGAZINES

30 INTERVIEWS

FOM2017 SPEAKERS

Marco Renggli,
Head of Global Component Engineering
at Siemens

Daniel Grundy,
Obsolescence Manager Supply Chain
at Safran

Peter Sandborn,
Professor
at CALCE at the University of Maryland

Ulrich Ermel,
Director New Business Development
at PULS GmbH

Phil Sansone,
Vice President,
Global Distribution Sales at Microsemi
Corporation

Kristie Syndikus
Vice President - Corporate Supply Chain
Management at Celestica

FOM2017 SPEAKERS

Willie C. Brown
Director, Sustainment Services
at Support Solutions at BAE Systems

Bill Scofield,
Engineer
at Boeing

Ryan Cartee,
Material Program Manager
at Raytheon

Ian Blackman,
Technical Manager
at IIOM

Tyler Moore,
Director Supply Assurance
at Arrow Electronics

David Spragg,
VP Engineering
at Arrow Electronics

Holger Krumme,
Managing Director
at HTV

FOM2017 TEAM

Bjoern Bartels,
Managing Director
at Am-sys

Glenn Bassett,
Managing Director and Founder
at NuVentures Limited

Enda Ruddy,
Global Director EMEA and FOM
at Converge

Rob Picken,
EMEA Director - FOM
at Converge

Bill Fliegel,
Americas Director - FOM
at Converge

Sebastiaan Ratha,
Director Asset Management
at Converge

Stanislava Petrova,
Marketing Manager FOM
at Converge

DANIEL GRUNDY

OBSOLESCENCE
MANAGER SUPPLY CHAIN

SAFRAN ELECTRICAL & POWER

Please tell us about your professional background?

I think we can say that my route here has been varied: I normally tell people I moved from Automotive Assembly to Aerospace, but that's strictly not true. I actually started my career in Electromagnetics, working as the Manufacturing Engineer for a range of Commercial off-the-shelf (COTS) and Custom industrial wound components.

It was here that I was first exposed to obsolescence, although at the time I probably didn't recognize it as such and viewed it more simply as a "design change". Several years later, while with Siemens, we overhauled a Range-Rover model with the largest electronic update the vehicle had ever seen and I was further exposure to obsolescence / last minute design changes that had to be accommodated. It was at this point that I began to see the importance of component selection within a system, to ensure its long term supportability.

Following seven years in the automotive industry supplying Land Rover and Toyota, I had the opportunity to move to Rolls-Royce and work within Supply Chain Sourcing. Sourcing gave me a fantastic background and I soon transitioned into obsolescence, where I was responsible for over 20 programs of varying age including supporting legacy fleet and some of Roll-Royce's latest developments.

Obsolescence was never an area of expertise that I'd considered before but I have enjoyed immensely for nearly 6 years and made the transition in 2016 to Safran Electrical and Power, where I now have over 200 units and responsibilities stretching from obsolescence to Counterfeit Mitigation and Registration, Evaluation, Authorization, and Restriction of Chemicals(REACH) to Conflict Minerals.

What trends in obsolescence management have you been observing in your industry?

I have seen a greater awareness to obsolescence management recently. I don't know if the driver has been REACH – which is having a massive impact upon the Aerospace industry in 2017 – or if it's due to some of the supplier rationalisations, resulting from the 2016-2017 mergers and acquisitions in the semiconductor market, both of which are impacting the rate at which we've been exposed to Product Change Notifications (PCN) and discontinuations.

A combination of both has certainly had an impact, resulting in a short term trend. However, both are recent trends and will phase out in the next few years: it's a short term, high volume increase in PCN's, similar to that seen with the lead free change 10 years ago.

The long term trend has been and will continue to be the transition from military specification or customer specific devices to COTS. This trend started as part of cost reduction activities, but since COTS have proven themselves their growth and acceptance has become prevalent. As for the type of COTS component, there has been a swing from the industrial devices back to the automotive specifications, partly due to the anticipated life expectancy of the automotive products.

Are there any industry practices around obsolescence that you would like to see improved? Please explain.

I think we all know and accept that obsolescence will occur. We live in an progressing technological world, as individuals we no longer expect our mobile phones to work in 6 years. As an industry – be it Aerospace, Industrial, Rail, Power Generation, Space or Telecoms – we all need to have a realistic expectation of product support.

Industry needs to work together while reviewing the product support strategy, clear communication and collaboration throughout the project is required, is the product expected to be operational for 10 or 40 years? This requirement should then be periodically reviewed, if the expected length of support should change, information needs to flow down to the suppliers so the impact of the change assessed.

Only by working together to aid the forecasting – up and down the supply chain, from the Original Equipment Manufacturers (OEM) to the chip manufactures – can we begin to plan product support strategies. Support strategies that can be bought by all parties, covering manufacturing plans, production volumes, planned production changes, product refreshes, Last Time Buys (LTB's), stock levels and reliability data. I don't know the "shape" of these practices, but I know that without increased communication, we'll not get there.

Specifically, what effect will the wave of chip manufacturer consolidations have on obsolescence?

Without a doubt we are seeing the effect now and there has been an increase in PCN's, LTB's and discontinuations. This is increasing the day-to-day workload for engineering and supply chain where we may have to provision for an increased level of inventory resulting from any of the LTB's.

The current disruption is a short term issue and is to be expected. Long term we need to work with the chip manufactures as they align themselves to a market or a technology type. Hopefully the long-term effect is that we will work with the manufactures to review our production and technology strategy alongside theirs and begin to plan – who are we using, are they aligned to our market? Do our technology roadmaps match? Does our technology need to progress?

From your viewpoint, what should the future of obsolescence look like?

It's a great question and one I've not stopped thinking about since the first FOM event. I know that I've already mentioned the need for closer and collaborative working relationships between customers and suppliers: please allow me to expand on that.

A company will quite often have a set of "Strategic Suppliers", many industries have their strategic suppliers on-site working alongside their own engineering teams. If an obsolescence issue results in a time bound design change, then making better use of these relationships in the future could help to reduce the number of design iterations and will speed up the change process. It also allows the manufacturer to tailor the design to meet their production capabilities.

There was one point that came out of FOM2016, that relates directly to the concept of obsolescence being a design change, and if design could offer any assistance to obsolescence. I understand the

limitations of change where customer approval and qualification testing is required; I'm not advocating an easier change control method, yet I do see scope to bring obsolescence towards the forefront to the programme timescale.

When we design our products are we hindering our future selves? What I'd like to see is a greater consideration to change – we accept that change will happen, therefore should we not build some level of flexibility into the design? This could be as simple as additional space on Printed Circuit Boards (PCB's) to allow for alternative components in the future, a few extra unused communication channels, modular builds, there are countless options available many of which are bespoke to each industry and to each OEM.

Is there any advice or suggestions you would like to share based on your experience with obsolescence?

Beyond all of the advanced databases, monitoring and reporting on availability, stock levels and run outs, nothing beats being close to an issue: the better the background knowledge and the more insight you can have on a product or system, then the more of a chance you have to resolve the issue. Stay close, become involved, and use the knowledge around you; no one can be expected to know it all, but within the business somewhere will be someone who has the answer.

I'm also a firm believer that with enough planning 90% of all issues will be identified, however there will always be an unknown element and the final 10% that can't be seen in advance, so plan and leave time for the unexpected – unfortunately facilities will catch fire, natural disasters do interrupt the flow of materials.

I guess a lot of it depends on the industry, the culture and the individual. Keep doing what works for you and change the parts that don't.

IAN BLACKMAN

TECHNICAL MANAGER

IIOM

Please tell us about your professional background?

I left school at 16 and wanted a career in Engineering but not as an Engineer, so I took on a Commercial Apprenticeship where I worked in business development, finance, contractual management, and production support before realizing that Procurement was what I liked best. If there was a car manufacturer or guitar manufacturer in my home town I might have chosen that! I worked in the Defence Sector for 30 years as a Procurement Management, Component Engineering Manager and latterly Obsolescence Strategy Manager. I then joined a trade association and events management company where I worked closely with the Component Obsolescence Group (COG) which has now become the International Institute of Obsolescence Management (IIOM). Since 2015 I have been contracted to supply services to IIOM through my own engineering and procurement consultancy company.

What trends in obsolescence management have you been observing in your industry?

The first one is the use of obsolescence management skills under different business areas including asset management, servitisation (the cultural change businesses need to undertake in order to make service and support their primary focus rather than the traditional manufacturing and spares cycle), logistics management, risk management, and supplier resilience.

The second is a growing need to understand and manage software obsolescence in the product and design infrastructure.

The third is the need to pay attention to design records and company configuration tools where important design data and test programmes reside. Failure to manage these will impact on obsolescence resolution capability.

Are there any industry practices around obsolescence that you would like to see improved? Please explain.

Too often a designer or obsolescence manager does not return to the original requirement before choosing a strategy to resolve an issue. Often the original environment has not been well stated or the product has significantly changed and is now better understood. A good engineer challenges the options available to find the best overall solution. Too often we take the easy path of replacing an obsolete part with one of the same functionality.

There is also a tendency to report—rather than address—known issues and, worse still, resolve all issues even though some need no action e.g. where you have a large reserved stock available or the part becoming obsolete has proven to be highly reliable. It's important not to just list issues but to prioritize them and take action.

It is vitally important to record last time buy stock and protect it so that new members of the team can clearly see it. One way to do this is to record it in an Obsolescence Management Plan. Often resolution funds are kept low so wasting money by purchasing spares for reliable equipment is preventing the resolution of more important issues.

What changes would you like to see chip manufacturers make to address future obsolescence challenges?

I'd like to see manufacturers of complex and high value semiconductors add low cost anti-counterfeiting features to the devices. I don't believe that these features are cost-prohibitive and the industry needs to help users identify quality products. Only the most frequently-copied devices need this functionality. Users would be happy to pay a small premium to have confidence in the component supply chain.

I'd also like to see improvements to the obsolescence notification processes to make them more visible to all users, not just recent purchasers.

Specifically, what effect will the wave of chip manufacturer consolidations have on obsolescence?

In my opinion, not as much as some observers believe. Recent mergers have not been for the purpose of rationalizing manufacturing or removing competition as most historic ones have been. Acquisitions have been made to acquire complimentary products and intellectual property to address new growth markets. An example would be a programmable logic supplier and a microprocessor company joining together targeting new markets such as data servers, industrial IOT, and autonomous vehicles. This is the consensus view of the UK component distribution sector. Past Mergers have led to very positive outcomes for the electronics industry. The semiconductor industry is reaching maturity and following the growth pattern of other industries such as automotive or computers, where consolidation of original manufacturers was common.

What impact do government regulations have on your obsolescence purchasing practices? Please explain the differences.

There are two areas where government regulations need to be understood.

The first is in environmental standards such as WEEE, RoHS, and REACh, which require much effort to obtain compliance and manage frequent updates. Two common difficulties are finding the resource to look at all possible uses and document the use of new items identified each year. It is also important to identify the actual amount to be consumed which can be difficult. The effort to submit a case for continued use is also considerable. Lastly, recommended alternative materials need not perform in the same way!

The second is in the adoption of international standards on anticounterfeiting that are being included in new supply contracts. It is now the responsibility of the designer to manage the risk of receiving counterfeits; not doing so may lead to substantial financial penalties and imprisonment for individuals.

From your viewpoint, what should the future of obsolescence look like?

It would be a world where consumer products and industrial products are supported for a minimum of five years to save on energy consumption and reduce the existing cost of disposal and recycling.

Obsolescence management would be recognized as a specific engineering discipline with practitioners seeking professional recognition for themselves and their companies. IIOM is working to achieve this with professional engineering bodies and specialist training providers.

Is there any advice or suggestions you would like to share based on your experience with obsolescence?

I think we need to recognize that although obsolescence management is just one factor in the product lifecycle, it has significant impacts on the sustainability of a business and its reputation with its customers. The real value of obsolescence management is often not recognized. Many long-term military support contracts are long in duration with values well into the tens of millions of pounds. If obsolescence causes a program delay or failure to meet performance criteria, the next contract may go to a competitor. In the UK, specialist support companies are picking up contracts from prime contractors.

For the prime contractor, the contract value loss may also be made larger by the loss of the replacement system development contract. Performing against the support contract is essential for the retention of employee skills and financial stability.

Register all instances of cost avoidance to show the value of your efforts to executive leadership.

Ensure that obsolescence feedback is available to the Procurement team so that new tenders identify any risks. This action can often be forgotten.


FOM

NATARAJAN MM

VP SALES SOUTH ASIA

ARROW ELECTRONICS

Please tell us about your professional background?

I have been with Arrow for 20 years and first started as a Product Manager in Bangalore, India, and later held positions as a manager and director for marketing groups. I currently manage the South Asia sales business.

What trends in obsolescence management have you been observing in your industry?

Technology is changing incredibly fast without particular logical progression. Analog IC's more complex SOC (System on a Chip) or ASIC (Application Specific Integrated Circuits) are getting developed for high runner applications so the lifecycle of the product keeps getting shorter.

Are there any industry practices around obsolescence that you would like to see improved? Please explain.

Mainly for defense and automotive, the electronics products design and development period is long -2 to 3 years. On the other hand, the typical window for product support given by suppliers on announcing obsolescence is short - 18 months to 24 months - which allows for a very short last-time-buy period and this is an area for improvement.

What changes would you like to see chip manufacturers make to address future obsolescence challenges?

Rather than developing application-specific devices, chip manufacturers could develop general open-purpose architecture devices which can be customized by software programing and can cater to wider range of multiple applications. This would lengthen the device lifecycle even if one of the application changes to a new platform. I believe this way the ROI (return on investment) will be better even for the suppliers.

Specifically, what effect will the wave of chip manufacturer consolidations have on obsolescence?

Chip manufacturer consolidation can cause a difference in silicon wafer technology. Some products may be the same for both companies and after a merger one of the two is made obsolete. Another possibility is that the new company does not operate in certain markets and opts to stop the manufacturing of products for these markets after an acquisition.

What impact do government regulations have on your obsolescence purchasing practices? Please explain the differences.

Governments deciding to use a particular technology or creating certain country specific standards and regulations can cause a product that doesn't match certain specifications to become obsolete. Current products continue to carry very old specifications and obtaining them becomes a challenge as most of the parts are obsolete in other part of the world.

From your viewpoint, what should the future of obsolescence look like?

As end products' and applications' lifecycle are getting shorter and we see the new version upgrade continuously, component industry will also see shorter component lifecycles.

Is there any advice or suggestions you would like to share based on your experience with obsolescence?

While designing a new product or application, ensure an open architecture or use a key component like controller / processor / FPGA which works on standard software and but is not customized for that device. This way, even if a component becomes obsolete, you will have to change only the hardware while your software investment is safe. Today major investment is being made in embedded products in software and if it is on a standard language like C ++ , Linux, Windows, or Android, redesigning a new platform in a very short time is an easy solution for component obsolescence.

JERRY LIU

SR. MANAGER, PROGRAM DEVELOPMENT

CYMER, AN ASML COMPANY

Please tell us about your professional background?

My 20+ of experience has been mostly in the semiconductor industry. I found Epitaxial and Polysilicon thin film process development to be interesting at Mitsubishi Silicon America. Then I started getting involved in, and never really left, the Semiconductor Capital Equipment industry. I served in various capacities—applications, product marketing, product lifecycle management, business operations, and program management in KLA-Tencor and Cymer, which is an ASML company.

In recent years, I have focused my attention on managing Cymer Light Source's obsolescence program. We have an amazing obsolescence team at Cymer with strong support from executive management. Collectively we have turned around Cymer's obsolescence program to be primarily proactive.

I started an industry expert group called Obsolescence Biz Experts in an effort to encourage collaboration and leverage expertise from fundamental research, industry users, and obsolescence management consultants for the furthering of obsolescence best practices.

What trends in obsolescence management have you been observing in your industry?

My own career shift is a testimony of how obsolescence has gained attention in the semiconductor industry.

Obsolescence, or DMSMS, is well recognized in aerospace & defense (A&D). Several other sectors have followed suite. The technology sectors, however, have not put obsolescence management to the forefront as a key issue until now. There are several seasons as to why. First, most people think technology products tend to have a short lifespan so why worry about parts obsolescence. The trend I'm recognizing is that more and more of my peers in the semiconductor capital equipment industry have realized the product support life is much longer than the product shipment life. This phenomenon is driven by… guess what… the economics. The key word in "capital equipment" is "capital", which means "very expensive". Our customers want to keep using the equipment longer. It's not uncommon at all to see semiconductor equipment being used for decades.

A common misconception is that the commercial products are not as mission critical as a F-16 for example, so obsolescence issues can be dealt with as they arise. That can't be further from the truth in the semiconductor industry. The customers of the capital equipment, the IC manufacturers, cannot tolerate any unexpected downtime. Because of the vital nature of the processing or metrology equipment, we work very hard to develop and qualify replacement parts or affected assemblies to ensure equivalent or improved performance. Some redesign efforts are very extensive, not only to complete engineering development, but also requiring sufficient in-house verification and field validation testing.

Obsolescence management is becoming an increasingly strategic part of our business as equipment manufacturers because of the longer support life as opposed to components procurement life, in addition to the need to proactively plan and address parts EOL issues.

Let me also share some new thoughts on how Artificial Intelligence will impact obsolescence. I believe the automobile industry will be paying a lot more attention to obsolescence management. Electronic content is forecasted to be 50% of the total cost by 2030 for automobiles, thanks to innovation in self-driving cars, etc. Shifting from a primarily mechanical system to 50% electronic would change how cars are made and maintained. Unlike cell phones, I suspect these expensive cars will still be on the road after two years. The support life of cars will be longer than the procurement life of spare parts. The auto makers will likely focus on innovation at this stage. However, I believe the ones with long term vision will understand the importance of sustainment, and will win in the completive landscape with the ability to satisfy the customers throughout the life of the cars, which can lead to a longer profit stream with proactive parts management.

Obsolescence management can actually be a differentiator in the auto industry going forward.

Are there any industry practices around obsolescence that you would like to see improved? Please explain.

I would love to see more sharing and exchange of obsolescence management best practices between the A&D and Semiconductor sectors. Both A&D and Semiconductor are big industries; around $1.7 trillion and $350 billion respectively worldwide. Obsolescence management is well known in A&D, but not in semi. Dedicated obsolescence management or DMSMS functions exist in A&D. You will find numerous DMSMS positions requiring specific job knowledge and skills on General Atomic's website for example. A number of industry standards on obsolescence management such as SD-22 and IEC-62402 are focused on A&D applications. Semi International, which is semiconductor industry's standard group, has no standards on obsolescence management. Major gatherings such as the DMSMS Conference in the US and the IIOM conferences in the UK are also dominated by A&D attendees.

There is obviously a wealth of knowledge in A&D that can benefit the semiconductor obsolescence managers who are beginning to emerge in this space. When I took on the challenge of managing Cymer's obsolescence program, I had no "play book" to work with. I had to figure out a lot of things myself which I later found to be existing best practices in A&D.

Conversely, I believe A&D folks can benefit from exchanging ideas with the new comers in the semi industry who have a fresh perspective and may offer creative solutions to common issues.

What changes would you like to see chip manufacturers make to address future obsolescence challenges?

The equipment manufacturers such as Cymer are both in the supply chain of the chipmakers and at the receiving end of their products as customers. As a customer, I'd like to see the PDN standards such as JESD48C being followed more carefully. For example, not all notices are given 6 months ahead of the EOL date, and not all notices allow a LTB. As a supplier, I'd like to make it more visible to the chipmakers (both IC and device manufacturers) how much efforts are put into managing parts obsolescence by equipment manufacturers. We invest a lot of engineering and operational resources to make obsolescence a non-issue for the customers. So having no interruption due to EOL issues is sometimes considered a given to customers. However, there is tremendous amount of effort maintaining the continuity of product or spare shipments with no performance shift.

Specifically, what effect will the wave of chip manufacturer consolidations have on obsolescence?

One important impact of these consolidations is the disruption of component lifecycle forecasting. Multiple resources are available to help equipment manufacturers forecast the remaining procurement life of the key electronic components. These forecasts are based on technology or historic data, therefore they are impacted by business reasosons such as consolidation. Based on my observation, most disruptions due to consolidation are accelerating the pace of EOL. I have yet to see an example going the other way. Pull-in of EOL date on key processors would have a significant impact on us. Processors define command sets and would require significant software and hardware redesign. As an example, a key controller we have contains a NXP processor. We are following up to ensure smooth transition in the post-merger stage with Qualcomm.

I would love to see more sharing and exchange of obsolescence management best practices between the A&D and Semiconductor sectors.

What impact do government regulations have on your obsolescence purchasing practices? Please explain the differences.

RoHS replacements are relatively easy to handle. We haven't seen a lot of impact from REACH. However, my fear is a component manufacturer may release a RoHS replacement with some changes rolled in without disclosing all the changes. Qualification efforts should never be under estimated. A subtle change can cause a lot of issue in timing sensitive control electronics, which are critical to processing and inspection equipment. So my message is to never underestimate the impact of a part change.

From your viewpoint, what should the future of obsolescence look like?

As an obsolescence manager, I have a very practical viewpoint. I would certainly encourage the advancement of proactive obsolescence management. However, I would not expect 100% of the obsolescence issues to be proactively managed. There will always be reactive management needs. Late PDNs, parts outside of electric/electronic space, and OTS boards are top reasons triggering obsolescence reporting outside of proactive lifecycle screening and monitoring. We continue to work with lifecycle monitoring service providers to expand proactive screening to mechanical parts and OTS boards. My idealized obsolescence management is a combination of reactive, proactive, and strategic efforts.

Obsolescence is a poster child for cross-functional cooperation. In addition to proactively screening and monitoring for more and more part types, we need supply chain folks to bring in their expertise and relationship with the component manufacturers and distributors. Some important updates are discovered at a review meeting or even a lunch conversation. We also need engineering to offer the critical thinking since they understand the equipment product best. The future of obsolescence will require a combination of different strategies working together to tackle these issues.

Is there any advice or suggestions you would like to share based on your experience with obsolescence?

Wouldn't it be great if we can collectively cultivate a more open culture of information exchange? Companies and experts from various parts of the obsolescence eco system bring their unique perspective and value. The more we work with each other, the more we can collectively learn and grow. Just by talking with experts in academia and the industries, we were able to apply new learnings and continue to innovate in Cymer's obsolescence management.

DIETER PAATSCH

STRATEGIC OBSOLESCENCE MANAGER

FESTO

Please tell us about your professional background?

My career path began at Festo when in the 1980s I completed an apprenticeship as an electronic technician. At the beginning, I was responsible for developing test equipment and software for functional testing of electronic circuit boards. In the 1990s I worked abroad for several years planning telephone networks in telecom industry in Brazil and teaching Informatics at Swiss International School in Rio de Janeiro. I completed a Master's degree in International Social Sciences and managed several development cooperation projects in Brazilian public schools. In 2004 I returned to my professional roots at Festo. My first project was a two-year transition of all electronic parts to meet the requirements of EU RoHS directive. In the following years I managed product certification and components management projects. Since 2011 my mission is the implementation of strategic obsolescence management at Festo.

What trends in obsolescence management have you been observing in your industry?

Looking back to the 1990s, there was a drastic change in consumer behavior that still influences obsolescence management in the electronics industry today. The proliferation and adoption of personal computers, mobile telephones, and the World Wide Web led to a significant increase of semiconductor sales in both industrial and consumer electronics. The short cycle rates of innovation of consumer electronics caused a permanent decrease in the lifecycle of electronic components, especially complex semiconductors.

Consumer behavior such as shopping via the internet, sending (digitally beautified) photos directly from the beach, buying and using the latest smartphone technology is the bright side of the medal. The dark side is a throwaway mentality which has created enormous mountains of toxic electronic waste. To limit that problem, governments reacted with legal restriction of the use of hazardous substances in electronics products.

In 2006 the EU RoHS Directive caused an immediate wave of obsolete components in our industry because most components contained the hazardous substances outlined in the directive. Concurrently, announcing product change notices (PCN) by email became a standard practice. In the last ten years, we observed a 10x increase of such notifications. That tendency will continue based on future market trends like Industrial Internet of Things. For example, The new IEC 62890 Life-Cycle-Management Standard will allow the evolution of components by versioning. This will affect the content and quantity of PCNs.

The obsolescence of components has become a permanent interfering factor in the production process. The costs and risks related to obsolescence are rising. Cost-efficient solutions to limit the impact of obsolescence have become a challenge for many companies. There is a transition from reactive to proactive obsolescence management strategies. The rising quantity of PCN led into efforts to standardize communication. And, last but not least, the prediction of availability of components is an unsolved major challenge.

In the last years you have been involved in the development of communication standard for product change notices. Tell us about the progress.

Historically PCN communication was based on writing letters or sending faxes; most manufacturers sent these directly or via distributors to their customers. Today the preferred communication channel is sending emails containing an annex with an official PDF document.

The present state of product change or discontinuation notices communication has no unique structure and no consistent content. Sometimes the content is just a scanned paper document. The manual reading and interpretation of hundreds of PCNs each year is demanding and very time-consuming work. For internal processing of PCNs we have already generated an SAP-based administration tool.

Considering the increasing amount of PCN communication, it was merely a matter of time

to think about electronic data exchange with our suppliers. Within the Component Obsolescence Group (COG), several obsolescence managers developed a universal XML-based data exchange standard, called smartPCN. The standard was released in 2016; currently we are seeing strong adoption with several manufacturers starting to implement and send machine-readable PCNs.

The obsolescence problem is advancing in the supply chain from the OEMs to the manufacturers in the machinery and plant engineering and other industrial sectors. Consequently, these manufacturers are searching for standardization of PCN communication in the same way. Actually, the obsolescence management working group of the German Engineering Association (VDMA) develops the VDMA standard sheet 24903 in cooperation with COG, defining the requirements for PCN communication in the machinery and plant engineering sector. The objective of the cooperation is to develop a unique communication standard.

COG already started further activities to harmonize PCN communication in other industrial sectors and also in the Industrial Internet standardization process. We are on a good way, but there's still a lot of work to be done.

How does smartPCN work?

SmartPCN was developed by analyzing hundreds of PCN communication cases and how PCNs are processed by the recipients. The result is a standardized format for communication, which allows the transmission of all relevant data around product changes and discontinuations. It is based on the widespread XML data format.

The obsolescence problem is advancing in the supply chain from the OEMs to the manufacturers in the machinery and plant engineering and other industrial sectors.

That point provides several advantages for PCN communication – the information details are clearly structured and consistent, the code can be generated manually with a form based editor, or automatically by mapping data out of any database. On the recipient side, the PCN can be read in the same way by opening the smartPCN in a form-based viewer. As well, it can be imported via XML mapping into any ERP system. The mapping procedure is easy and any IT department or service can do that.

Another important feature is the definition of a detailed set of categories. Through categorization, the subject and the relevance of the incoming PCNs can be interpreted much easier. SmartPCN also allows the attachment of additional documents like datasheets, drawings, or lists. By the attachment of previous smartPCNs, PCNs can be cascaded.

All those features allow a highly efficient automated reading process. PCNs can be preselected, processed and forwarded by relevance, urgency, or any content.

What changes would you like to see chip manufacturers make to address future obsolescence challenges?

I see that the short lifecycle of many semiconductors is challenging for chip manufacturers. The development of innovative semiconductors is mainly driven by the enormous and extremely dynamic consumer market. Other industrial sectors like automotive, transportation, or aviation do use

those innovative components, but there's a strong demand for long term availability. The establishment of industrial product portfolios with long lifecycles could be an important step to reduce the impact and costs of obsolescence.

Another challenge is the uncertainty of the "Years to End-of-Life" information of many components. For this purpose, most of the companies use lifecycle prediction tools. The problem is that the algorithms are non-transparent and mainly based on statistical data. The crux of statistics is that you cannot provide an exact prediction for an individual component, because statistic values are average values. This vague data complicates the development of obsolescence-resistant products and redesign planning. It results in inefficient obsolescence driven redesigns, expensive long-term storage, and aftermarket procurement. Worldwide every year millions of unused components become electronic waste because they lost function or processability during storage.

The top three demands customers frequently have for their suppliers across the supply chain are more products with long-term availability; precise lifecycle data; and timely information about product discontinuance. For suppliers, it is often difficult to fulfill those requests, because the suppliers are submitted to the market trends and often depending on the long-term availability of the components of their suppliers. It is a vicious circle. From the long-term perspective we can only achieve improvement by a permanent cooperative interaction. This should happen on the level of supplier customer relationship, as well as in associations and networking platforms like COG, FOM or VDMA.

Specifically, what effect will the wave of chip manufacturer consolidations have on obsolescence?

Manufacturer consolidation is a market trend that we observe in many sectors. It is based on the promise of more efficiency, raising profits, or stabilization of the market position. Concerning the chip manufacturers the exploding investment costs – caused by new wafer technologies – is another driving factor for consolidation. To predict the effect of this trend, we can learn from other cases where this concentration already happened, for example retail sector. Consolidation led to less variety and individuality of products, and at the same time, to more innovation and better product alignment.

We've already experienced merger-based obsolescence cases and loss of second sources in our daily work. Innovation is the motor of the consolidation of chip manufacturers. What's more? In my opinion, the life cycle strategy of the chip manufacturers will continue following the market demands. In the near future, the computer and smartphone industry will still determine the cycle rates.

What impact do government regulations have on your obsolescence purchasing practices? Please explain the differences.

At the moment, we do not have much influence of government regulations on obsolescence purchasing practices. The upcoming of RoHS legislations in the beginning of the new millennium showed what impact they can have. Thousands of components became obsolete and had to be substituted in a short time. Furthermore, millions of stored hazardous substances containing components had to be discarded by OEMs because of non-compliance to the RoHS directive.

New environmental and human rights-based regulations will inevitably come in the next years, influencing our product designs and production processes for a good reason. Continuous monitoring of regulative developments and quick reaction to changes is the minimum we should do. If we have a look into the formation process of new EU legislations, we can see that manufacturers can contribute to the legislation process by the panel of experts of the European Commission. The industrial associations play an important role here. Proactive obsolescence management also means participating in the definition of legislations and standards instead of waiting for the impact.

From your viewpoint, what should the future of obsolescence look like?

I believe that the future of obsolescence has to be faced by cooperative obsolescence management along the supply chain. Production processes are dynamic systems, and obsolescence as a disruptive factor can have enormous financial and environmental consequences. The involvement of the obsolescence aspect in the product development process and lifecycle management will become regular. Reducing or avoiding the negative impacts of obsolescence should be the overall goal of obsolescence management.

The mentioned cooperation began many years ago by creating networking associations, service providers, and standardization. The standardization of PCN communication is demand-driven in many sectors. The main challenges in the next years are the harmonization of these efforts and the improvement of end-of-life prediction.

Is there any advice or suggestions you would like to share based on your experience with obsolescence?

Obsolescence is an inevitable stage of the product lifecycle. Since we cannot avoid obsolescence, we should permanently reflect on—and improve—the process of managing it. That is our homework.

We need to join our forces in order to cope with the big challenges and design the future of obsolescence management. The development of the PCN communication standard is a good example of successful cooperation between suppliers, customers, and service providers.

The creation of smartPCN as universal communication standard was a milestone. The actual challenge is to spread and establish the standard in all supply chains. You can do your part asking your suppliers for standardized PCN or sending such PCN to your customers.

KENT WADE

VICE PRESIDENT – SALES

INTEGRA TECHNOLOGIES LLC

Please tell us about your professional background?

I have been in the semiconductor test industry for thirty years. I started with NCR Corporation when device manufacturer quality was so bad that 100% of incoming tests were required behind the supplier before releasing parts to our manufacturing lines. Device quality and technology has improved greatly over the years, but the importance of supply chain management is as critical as ever, especially when dealing with obsolescence and counterfeit mitigation. Throughout my career, I have been fortunate to work for both the users and makers of component devices. On the user side with NCR, AT&T Bell Labs, and Lucent, the focus was working with device manufacturers on quality improvement so we didn't have to test parts behind them. We also focused on supply-line management efforts to keep manufacturing lines running. On the maker side with Amkor Technology, I worked with most of the chip manufacturers (IDMs and Fabless companies) on the test side with their new product development. The model included developing and optimizing the device test software, performing final test services until production worthy, and then moving the test setup offshore for volume assembly and test. In 2005, I spun off with our Amkor Test Services group into Integra Technologies, LLC, continuing to support both the chip users and makers with test software development, final test and device qualifications. Currently I am VP of Sales at Integra Technologies and work with accounts in the Military & Aerospace industry on PEM qualifications, -55C screening, uprating, and counterfeit detection of components.

What trends in obsolescence management have you been observing in your industry?

Companies today are tracking and communicating obsolescence issues better than I have ever seen. The counterfeit issue in our industry seemed to put a spotlight on obsolescence and re-energized companies to formalize processes, especially with the procurement of non-franchised parts. Counterfeiting of devices is a huge problem that costs everyone additional time, resources, and money to prevent. The counterfeit issue was the event that triggered driving government regulation to force all of us to deal with obsolescence in a more structured approach. The good news is that companies have implemented new procedures and teams across all departments to improve their parts selection, replacement, buying, tracking, and overall BOM management. These obsolescence teams are now proactively tracking and managing device obsolescence. Companies that have implemented obsolescence teams are in a much better position to react on the issues as they arise.

Are there any industry practices around obsolescence that you would like to see improved? Please explain.

I would like to see more companies include their suppliers on obsolescence issues. The supply chain wants to help and has a ton of industry experience and contacts. You might not think a test lab can help solve your issue of finding obsolete parts, but we have surprised many military and aerospace companies by solving issues with creative solutions through our relationships in the industry. Please ask your supply chain partners to help out.

What changes would you like to see chip manufacturers make to address future obsolescence challenges?

Many of the chip manufacturers continue to make progress supporting the military and aerospace companies. Communication regarding discontinued parts and process changes have improved. I even see a few chip companies providing support on counterfeit part questions and part failure questions. My wish list for additional support from the chip manufacturers:

1. Work with test labs on product going obsolete.

In past years, chip suppliers and test labs had a great working relationship. In many cases, the test labs were the final test processing facility for industrial grade and military grade components. Once the product went obsolete, chip suppliers let the test labs continue the test support directly with customers by allowing the test programs and test hardware to be used. Now most of the chip assembly and test processing is done offshore and/or completed by a third party Outsourced Semiconductor Assembly and Test (OSAT) company like Amkor. When products go obsolete now, future support is spotty at best and depends a lot on if the product line was sold to anyone. For continued test support, customers are required to fund the NRE and re-develop the test software and hardware. On a complex device, the efforts can take over six months and cost over $100K to develop. If the product line is not sold to an after-market provider, I would like to see chip suppliers work with test labs to maintain the customer support and eliminate the high NRE costs.

2. Implement a better part numbering system to identify parts that have Copper Wire bonding.

Chip manufacturers have switched over to building product with copper wire bonding, but didn't completely change the part numbering. This makes it difficult to identify if the product was built using copper wire bonding. Failure modes specific to copper wire bonding are being seen in qualification testing. Specific tests are being implemented for copper wire bonded parts which means the issue of not being able to identify by the part number is causing a lot of problems.

Specifically, what effect will the wave of chip manufacturer consolidations have on obsolescence?

My experience working in the device manufacturing world doesn't give me much hope that anything will improve from chip manufacturer consolidation. The volatile cycles in the semiconductor industry require quick decisions on product lines. Low volume, high mix product lines get cut for high volume, low mix product. This situation has been the reality for the military and aerospace industry for a very long time and I don't see it changing.

From your viewpoint, what should the future of obsolescence look like?

Obsolescence management requires a team approach that involves participants from many departments. Program managers, engineers, and buyers must team up with their supply chain to highlight and work issues as they arise. Active involvement is required to track supplier Product Discontinuance Notifications (PDNs), Product Change Notifications (PCNs), and forecast device end-of-life with replacement options for each part in the Bill of Materials (BOM). Companies that don't have an active obsolescence program will struggle to deliver and support their products in this environment.

Is there any advice or suggestions you would like to share based on your experience with obsolescence?

Besides implementing the obsolescence team, companies must give the team authority to react quickly. I have seen companies search the world for an obsolete part and find exactly what they need, but lose out on getting them because it took so long to approve and issue the purchase order. Teams need to ask for help from all players in your supply chain if having a major problem with an obsolete part. We have seen some chip manufacturers go out of their way to help out, even re-start the product line for one more last time buy. Attending obsolescence conferences is also a great way to learn from the industry pros and get updated on the latest industry tools and suppliers.


WELCOME TO FOM

HOLGER KRUMME

MANAGING DIRECTOR

HTV

Please tell us about your professional background?

For the past 16 years I have been the technical director at HTV, a leading provider for services for electronic components. My responsibilities include the development and optimization of the HTV TAB®-procedure.

What trends in obsolescence management have you been observing in your industry?

In recent years, the number of company mergers between large semiconductor manufacturers has increased. As a result, more product lines are brought together due to financial reasons and many components are discontinued at short notice. This trend is also one of the main reasons that components become obsolete. Especially in industries where the product lifecycle is long, like aerospace and defense, medical, automotive, etc., manufacturers are faced with finding replacement components. This can create a rising issue on the market which is particularly well known by purchasers and developers. Often, some components from a larger electronic assembly are already discontinued in the product development phase or shortly after market launch which leads to an expensive redesign process.

Are there any industry practices around obsolescence that you would like to see improved? Please explain.

Companies should have a department which proactively deals with obsolescence and regularly evaluates relevant components´ availability. Holistic concepts and strategies must be developed in order to enable the availability of replacement components, whether obsolete or not, over a longer period.

In recent years, the number of company mergers between large semiconductor manufacturers has increased.

The way spare components are stored plays a key role for their functionality and processability for the long term. Some service providers offer unique storage procedures. For example, HTV's Long-Term Storage drastically reduces the decisive physicochemical aging processes and allows components to be safely stored for up to 50 years, in comparison to the average 6-12 months..

Moreover, expenses for a proactive or strategic obsolescence management should directly be budgeted within the product calculation.

What changes would you like to see chip manufacturers make to address future obsolescence challenges?

Product discontinuations cannot be prevented; however, they should not occur at short notice or unexpectedly. Severe product modifications, equivalent to discontinuations, are often not communicated as such. Ideally the PTN (Product Termination Notification)/ PCN (Product Change Notification) should be announced by the manufactures at a much earlier stage. This will allow enough lead time to take reasonable measures without influencing the delivery capability.

Specifically, what effect will the wave of chip manufacturer consolidations have on obsolescence?

As I already described, the growing number of company mergers leads to a drastic increase of obsolete components. The companies that do not dispose over a functioning obsolescence management will have difficulty retaining the availability of replacement components, particularly for products and capital goods with a long operating life.

From your viewpoint, what should the future of obsolescence look like?

As a part of a forward-looking corporate policy, a strategic and proactive obsolescence management should be firmly established within each company. The best scenario is a separate department reporting directly to the executive board.

Cooperation with the development department, the quality management, and the purchasing department is mandatory for the prevention and processing of obsolescence cases. The estimated availability is calculable with the help of appropriate tools. Major replacement components should be conserved long-term to avoid any danger due to the availability of insufficient parts.

Is there any advice or suggestions you would like to share based on your experience with obsolescence?

With the help of a proactive obsolescence strategy, damages resulting from product discontinuations can often be reduced. However, purchasers should keep in mind that advanced forecast tools can still be misleading at times. Therefore, long-term component storage is a more reliable method to cope with obsolescence.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