Proactive vs. Reactive Approaches to Obsolescence Management

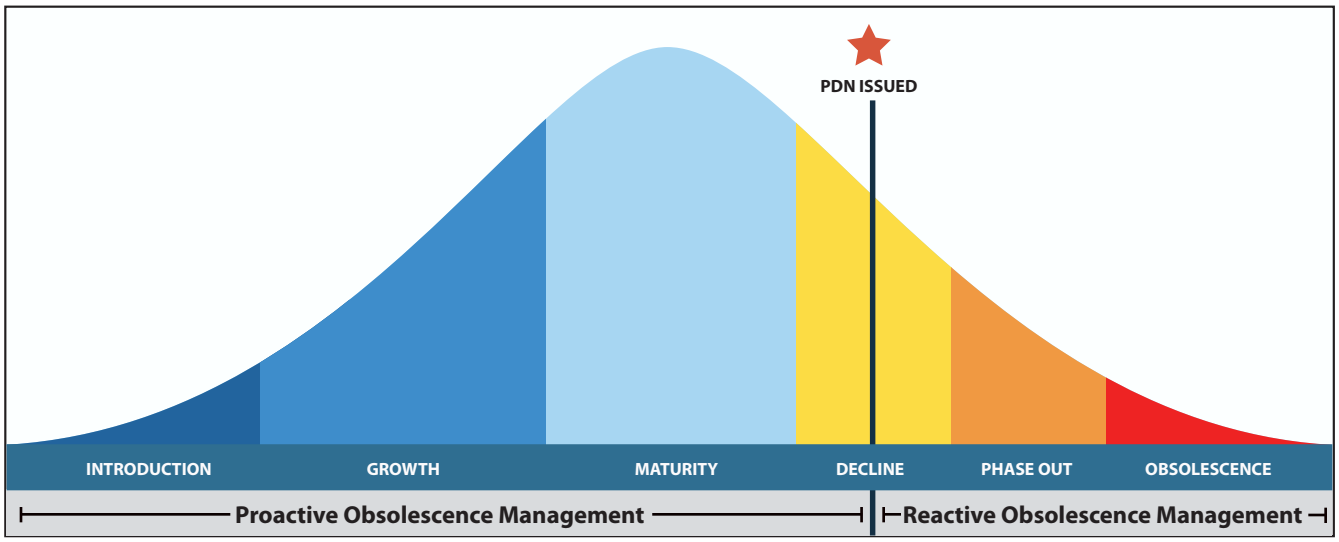
A case for proactive obsolescence management using lifecycle forecasting algorithms from independent component databases.

Abstract

Commercial and Defense/Aerospace OEMs (Original Equipment Manufacturers) daily face the risks of component obsolescence and the resulting impacts on the longevity of their end products. Regardless of the lifecycle length of the end product, all OEMs have some measure of obsolescence management in place in order to mitigate the risks and costs of diminishing components. Historically, defense, aerospace and commercial OEMs with long end product lifecycles have placed greater emphasis on a well-managed obsolescence strategy. Conversely, OEMs with smaller end product lifecycles have placed less emphasis on sophisticated proactive approaches to obsolescence management, relying mostly on reactive measures.

This whitepaper makes a case for all OEMs, regardless of size, to use proactive obsolescence forecasting measures. This whitepaper also illustrates the risks of using component lifecycle forecast data points from the manufacturers themselves, versus using forecasts based on algorithmic & historical data points from independent electronic component databases. With the growth and sophistication of electronic component databases growing yearly, lifecycle forecasts, intelligent component selection, and overall obsolescence mitigation are within reach of all OEMs.

Figure A - Proactive vs Reactive Obsolescence Management at the Component Level



Proactive & Reactive Approaches to Component Obsolescence Management

Obsolescence management strategies of OEMs can be categorized within two distinct realms: Proactive & Reactive.

A reactive approach to obsolescence management relies on taking action once a component event such as the release of a Product Discontinuance Notice (PDN) has already occurred, advising the OEM of an impending change in the component's lifecycle. PDNs sourced through direct relationships with manufacturers, distributors, contract manufacturers and/or component databases then signal the OEM to react to the upcoming lifecycle change of the component.

Proactive approaches, however, focus on predicting component obsolescence prior to the issuance of the PDN. OEMs using a proactive approach to obsolescence management assign risk grades to each component and have appropriate measures in place to deal with the lifecycle change of a component in the future. Such an approach allows the OEM to predict lifecycle events long before a PDN is ever issued, allowing time to dedicate resources, find solutions and predict cost months or years in advance. Data points for forecasting obsolescence of a given component are collected either from

the manufacturer itself or via independent component databases that determine the obsolescence dates using algorithmic and historical data of any given product type.

Solutions for Mitigating Component Obsolescence Risks

Regardless of the approach, most OEMs[1] utilize one or a combination of three solutions to mitigate the impacts of obsolescence: 1) source the same component through lifetime buys or aftermarket distributors, 2) redesign the end product or 3) find a cross for the component that is the same form, fit and function.

Lifetime buys force the OEM to procure the component for the long term and store the inventory for later use as manufacturing continues. The quantity of purchase is determined by the predicted future use of the component. Although a prevalent solution used by OEMs, lifetime buys increase the OEM's warehousing costs while exposing the components to moisture, oxidation and dust. In addition, OEMs run the risk of miscalculating necessary quantities, as lifetime buy assumes that system design remains static over its respective lifetime.[2] Predicting future use also assumes static rates of damaged, lost or unusable components and exposes the OEM to additional costs such as discarding excess inventory.

If aftermarket distributors are used to procure the obsolete component, the OEM can now expect the component to be priced significantly higher as supply of the product has now decreased to a select few sources. In addition, if unauthorized brokers are used to procure the component, then the OEM exposes itself to possible counterfeit and lower-quality components.

Redesigning the end product is another solution for the OEM and one which recreates all of the costs associated with design, manufacturing, legal and qualification stages. Entire product redesigns due to unavailability of a single component are not only expensive but are at times impossible from an operational standpoint, as a single end product might experience an exorbitant amount of component obsolescence over its lifetime. Design refreshes should be planned carefully and proactively and are thus less likely to be pursued with a reactive approach to obsolescence management.

One of the most practical and least expensive options for tackling obsolescence is to find alternative components (crosses) that are still active and comply with the same or similar form, fit and function of the original component. The cross, either from the

1. Large high volume consumer OEMs seldom use their market power to force the component manufacturer into keeping the obsolete part active, thus eliminating the need for obsolescence management based activities altogether.

2. Feng, Singh, Sandborn, "Lifetime Buy Optimization to Minimize Lifecycle Cost," (2007)

same manufacturer (a "replacement") or a competitor, can allow the OEM to continue manufacturing the end product while sourcing the new part with minimal design changes to the existing system. Component Engineers tasked with finding crosses rely on their own domain expertise, guidance from their distributors or contract manufacturers, websites of the competitors of the original component manufacturer or, increasingly, independent component databases that compare parametric data across the product type. Using automated processes to dynamically compare deep parametric, dimensional and electrical characteristics, independent component databases can find and grade crosses between all manufacturers they track. These independent component databases can save the OEMs countless man hours and costs associated with researching and sourcing alternative components.

Risks of a Reactive Approach to Obsolescence Management

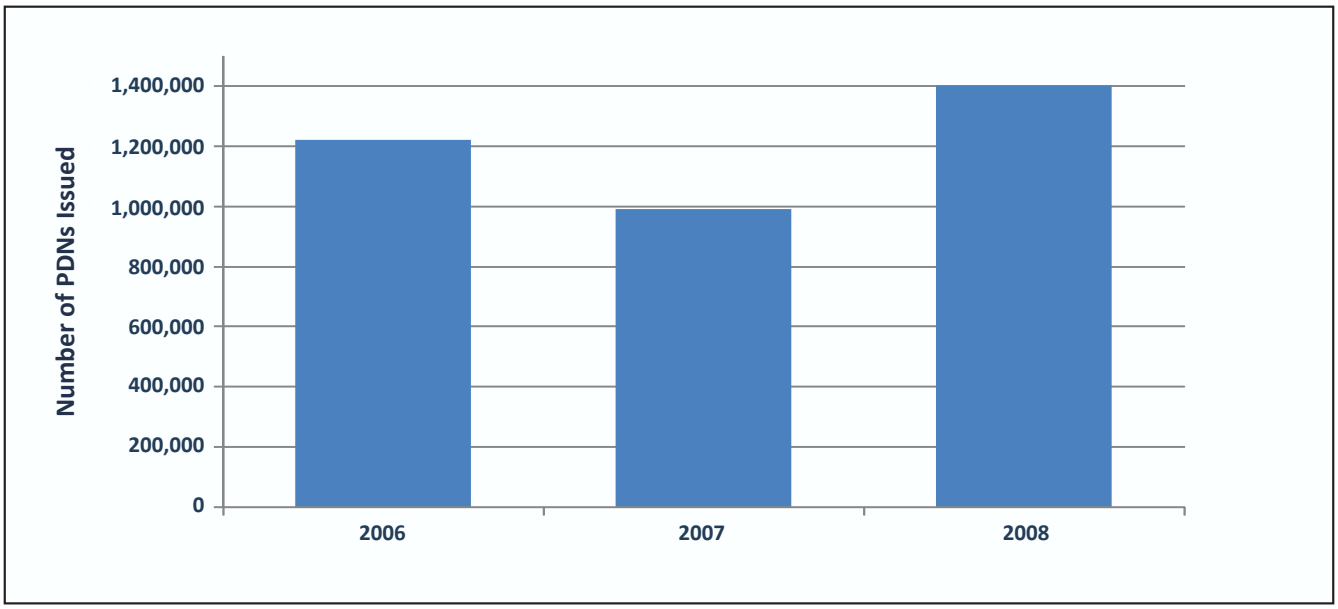
Although all three options are viable, the relatively small window of opportunity in a reactive approach to obsolescence management prevents most OEMs from pursuing a design refresh strategy. Most product redesigns are planned in advance and are not a viable solution to combat single component obsolescence issues. As such, OEMs reacting to a previously unknown obsolescence event are restricted to either stocking large quantities of the component in question or finding a cross.

Figure B shows the number of obsolescence notices that were tracked by SiliconExpert Technologies between 2006 and 2008. Of the 150 million electronic components in SiliconExpert Technologies' Parts Database, approximately 1.4 million electronic components had obsolescence PDNs issued in 2008. Clearly, design refreshes and lifetime buy strategies with a reactive approach to obsolescence management are simply not feasible for every obsolescence event.

A delay in finding a speedy solution inside an already constrictive window of opportunity can cause production delays that affect market availability of the end product, increase costs of warehousing large quantities of the obsolete component, create supply chain nightmares for both the OEM and its contract manufacturer and add legal and launch cost increases.

With a time-constrained window of opportunity due to a reactive strategy pursued by the OEM, even the most viable strategies for mitigating obsolescence risks can become impractical.

Figure B - Number of PDNs issued for electronic components in years 2006-2008



Source: SiliconExpert Technologies

Accurate Proactive Obsolescence Management

But where to procure obsolescence forecasts in order to create a proactive obsolescence strategy? OEMs have historically relied on component manufacturers to predict the obsolescence of their respective products. Utilizing obsolescence data from the component source itself would appear to be a credible source of information.

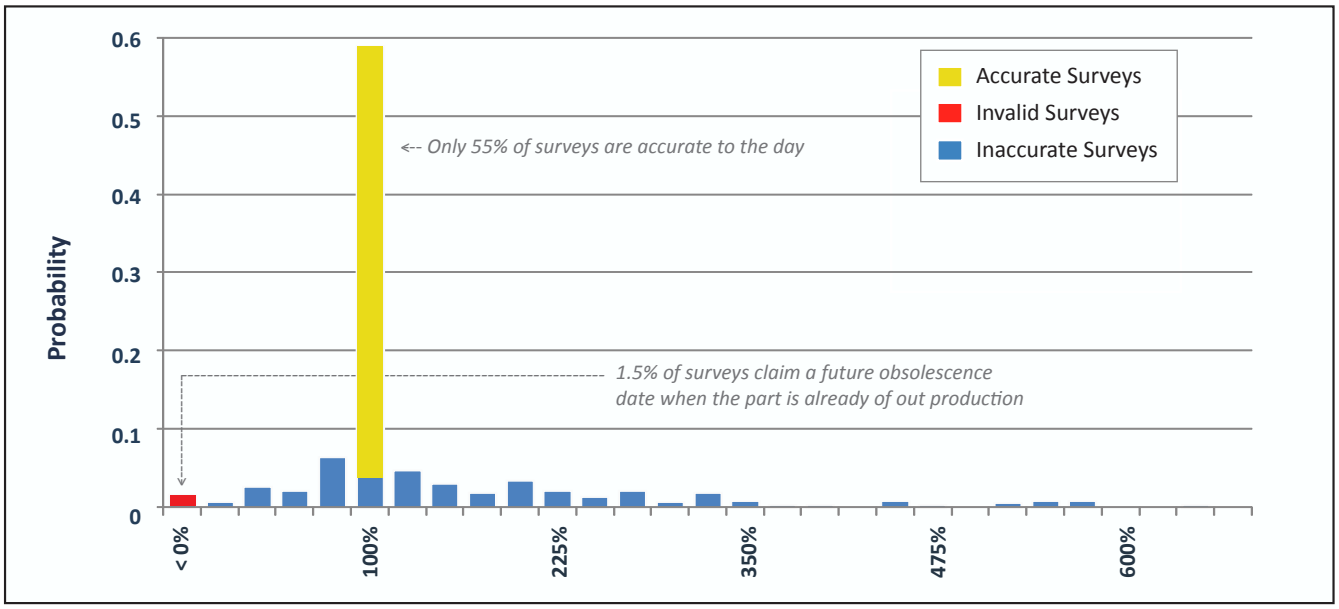
Unfortunately, component manufacturers are not always accurate in their obsolescence predictions. According to a survey conducted by NAVSEA DamNeck in 2007, component manufacturers accurately predicted the obsolescence of their own parts only 55% of the time (see Figure C). Actual obsolescence is "more likely to occur after the estimated date (28%) than before it (17%)." In addition, 1.5% of the component manufacturers incorrectly stated that their parts were still in production when they were already obsolete.[3] As such, it is quite evident why "manufacturer responses are not highly regarded for their accuracy … and other types of forecasting are needed."[4]

With the prevalence and sophistication of unbiased, independent component databases growing rapidly each year, it is necessary at times to consider a third party viewpoint

3. Michael Gaintner, "Analysis of End of Production and End of Support Dates at the LRU level," (2007)

4. Sandborn, Prabhakar, Ahmad, "Forecasting Technology and Part Procurement Lifetimes to Enable the Management of DMSMS Obsolescence," (2008)

Figure C - Actual time to obsolescence vs. Manufacturer claimed time to obsolescence



Source: Michael Gaintner - NAVSEA DamNeck (2007)

while pursuing a proactive approach to obsolescence management. Component databases, such as SiliconExpert's Parts Database, bring a unique perspective to calculating obsolescence forecasts, using historical and algorithmic methods to predict component events. Covering thousands of manufacturers and millions of parts, today's web-enabled component databases make obsolescence forecasts and assign risk grades based on factors ranging from market availability of a given component from distributors and technological improvements in a given product type to historical obsolescence behavior of a given manufacturer.

Conclusion

Mitigating the effects of component obsolescence in an intelligent and proactive manner has become necessary in today's dynamic electronic world. Reacting to obsolescence events that occur without prior knowledge is an added risk for the OEM which can add exorbitant costs and delays to the end product's own lifecycle. Proactive approaches to obsolescence management using data points from independent sources, such as SiliconExpert Technologies' Parts Database, allow OEMs to better manage risk and obsolescence in a sophisticated and well-planned manner.

About SiliconExpert Technologies

SiliconExpert Technologies' Electronic Parts Database is one of the most accurate, comprehensive and current in the industry covering hundreds of product lines and thousands of suppliers. End-of-life (EOL) forecasting, finding Cross References (form, fit and function alternatives), Lifecycle statuses, Parametric Data and Product Change Notice (PCN) alerts are a few of the features of SiliconExpert's suite of products that provide BOM Management and Obsolescence mitigation solutions. SiliconExpert's customer base includes leading commercial and government OEMs, top-tier authorized distributors, contract manufacturers and component suppliers.

SiliconExpert Technologies, in collaboration with University of Maryland's Center for Advanced Life Cycle Engineering (CALCE), has integrated advanced risk analysis with obsolescence forecast algorithms designed specifically for its components database. Utilizing four risk factors -- lifecycle, multi-sourcing, environmental compliancy and market availability -- the algorithm assigns a risk grade and obsolescence forecast to all parts within the 337 electronic component product lines of the database.

SiliconExpert's Part Search™

Search 150+ Million electronic components through an easy-to-use interface. Gain access to datasheets, cross reference data and daily inventory feeds from 120 authorized distributors. Find out current lifecycle status, PCN/PDNs connected at the part number level and run risk analysis on individual parts. Part Search™ also allows you to compare parts parametrically within individual product lines. Find out more and sign up for a free demo at www.siliconexpert.com/partsearch.

SiliconExpert's BOM Manager™

Scrub & edit thousands of parts in seconds. Forecast component obsolescence & conduct risk analysis on your entire Bill of Materials using advanced algorithms designed specifically for SiliconExpert by the University of Maryland's Center for Advanced Life Cycle Engineering. Find instant crosses that match form, fit and function to your components. Setup email alerts to track entire BOMs for ongoing changes. Includes subscription to Part Search™ by default. Find out more and sign up for a free demo at www.siliconexpert.com/bommanager.

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