

Solving the Parts Obsolescence Dilemma

Finding Replacement Components
with the Least Amount of Effort



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White Paper

Abstract

The purpose of this white paper is:

- To define the problem of electronics parts obsolescence
- To introduce the reader to four methods for addressing this growing problem:
 - (1) accessing comprehensive databases that contain parts replacement information,
 - (2) using off-the-shelf and internet-based tools to aid in finding relevant information within these databases,
 - (3) implementing a complete business solution that integrates obsolescence information throughout the organizational business processes, and
 - (4) adopting an industry-wide open system architecture.

The Rising Threat of Parts Obsolescence

Manufacturers in both the commercial and government sectors face many challenges. Whether it's developing a competitive product, controlling production costs, or meeting time-to-market demands, manufacturers must deal with several issues during the development cycle that ultimately determine whether the product will succeed or fail. Compounding these issues is a growing industry challenge that affects products throughout the entire life cycle — electronic parts obsolescence. A serious concern to all manufacturers, parts obsolescence is the loss or impending loss of the components that make up the end product.

The causes of parts obsolescence are many. To keep up with the continuing advances in electronics, parts manufacturers phase out products that use yesterday's technology. A shortage in the raw materials for the component can also contribute to its untimely obsolescence, unless another comparable source can be substituted. As a manufacturer tweaks a component's design while it's on the production line to minimize costs and maximize yields, the part's form, fit and function can become altered to the point of unusable in certain applications. But the most prominent reason for parts obsolescence is the financial bottom line. As soon as it becomes cost prohibitive to produce a part, manufacturers often cease production to concentrate on more profitable lines of business.

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In today's marketplace, electronics development and sales are driven by consumer applications. These applications (e.g., cell phones, computers, digital gadgets) are notorious for having short product life cycles to meet consumer demand for faster, cheaper and smaller technology. But for items intended to last longer than a few years, the problem of parts obsolescence can severely impact product supportability and life cycle costs. Items such as airplanes, automobiles and military

weapons often have life expectancies ranging from 20 to 30 years and are nearly guaranteed to outlive most of the internal components that make up the final product.

In reality, the threat of parts obsolescence for built-to-last products can occur before the item ever leaves the assembly line. In the automotive industry, manufacturers typically invest in three to five years for product development, and once the model is launched, it is often in the market for another 20 years. In order to secure both production demands as well as meet the needs of in-the-market repairs, the goal of automotive manufacturers is to maintain enough spare parts for at least 25 years per model. And with the life span of typical electronics components peaking at 12 months, finding the parts to meet this 25-year commitment is becoming more and more difficult.

Methods of Managing Parts Obsolescence

Because of the disconnect between the life cycles of electronics parts and the equipment they go into, manufacturers must consider parts obsolescence strategies throughout the product development cycle. This is especially true for products with long development cycles where parts need to be available for a longer period of time, as well as for government applications where product certification costs are high. In most scenarios, a solution for an obsolete part must be found quickly, particularly if the part is critical to the functionality of the system.

When confronted with the situation of a non-procurable part, manufacturers have four main methods of resolution.

Substitution

Use a different part with the same or similar form, fit and function. Manufacturers can find comparable substitute parts from different vendors, or at times, the same manufacturer will emulate a new component identical to the original using fabricated materials or newer technologies.

Lifetime Buy

Purchase and store enough parts from the original manufacturer or an aftermarket vendor to meet the predicted need of the product's production and repair life span. With this option, companies assume extensive costs up front and incur ongoing storage fees.

Additionally, manufacturers run the risk of not redeeming the value from a long-term purchase in the event that they buy too many supplies, lose the parts over time or decide to halt production prematurely. Moreover, there's the chance that the electronic part may become unusable with prolonged storage. The quality of a part can deteriorate with oxidation, dust, dried compounds and discoloration over time.

Reclaim

Salvage the part from other products using the same original component. Again, this option could involve significant cost, time and risk. Manufacturers must locate a product in which the part was used, determine whether there is a substantial supply of these salvaged items, remove the needed components, and, if needed, refurbish the part so it meets all quality criteria.

Redesign

Remove all obsolete parts from the product design and begin manufacturing a new replacement. This is, by far, the most costly alternative for parts obsolescence. Whenever a product redesign occurs, manufacturers must factor in non-recurring engineering expense as well as the cost of re-qualifying the product for government, consumer or industry quality standards.

Manufacturers typically develop short- and long-term strategies for replacing obsolete components to avoid costly production downtime and uphold repair commitments to end users. Some strategies are used in conjunction with each other. For example, an aircraft manufacturer may opt to secure a "bridge buy" to keep existing planes flying until an upgrade for the entire fleet can be designed and manufactured.

For many, the substitution method is the first step toward parts obsolescence management. This option often saves considerable expense by avoiding a costly redesign, or worse, announcing the product as unsupportable. However, finding the appropriate substitution across the thousands of applicable parts manufacturers can be a daunting task.

Although there is an extensive network of resources and raw information regarding electronics parts, it can be extremely cumbersome to search for parts across multiple data sources. For each resource, the engineer must contact the company, gain access to the database, determine the appropriate search criteria, retrieve a list of pertinent data — and then repeat this process for

the thousands of other available resources. Because of the overwhelming volume of information available, it is nearly impossible for the user to complete an exhaustive search to find the best alternative. This can lead to unnecessary cost when a more expensive or less-than-adequate solution is selected, or a redesign is mandated because the perfect fit was never found.

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Because of the current, cumbersome task for conducting an exhaustive search across heterogeneous data sources, manufacturers often only conduct parts research when it's a critical situation and they need the part...immediately. This reactive versus proactive response can wreak havoc for manufacturers, causing them to miss critical product development milestones, extend launch dates, halt production lines, ground unusable equipment and ultimately incur extensive cost.

A Tiered Approach to Parts Obsolescence Solutions

IHS is the leading worldwide provider of technical content and information solutions for standards, regulations, design guides and parts data. IHS Enterprise Solutions is the consulting arm of IHS, providing information and data management applications and services for a wide range of commercial, educational and government organizations.

To meet the needs across its diverse manufacturing client base, IHS Enterprise Solutions suggests four levels to resolving the parts obsolescence dilemma. These levels, listed below and discussed in the following sections, serve as building blocks to a complete parts obsolescence solution. While Level 1 is the first step toward finding alternatives for an obsolete part, Level 4 offers an approach to eliminating parts obsolescence altogether by standardizing systems architectures across industries for government and consumer applications.

- **Level 1:** Access to Comprehensive Parts Data
- **Level 2:** Tools to Help Consolidate and/or Interpret Parts Obsolescence Data
- **Level 3:** Develop an Integrated, Enterprise-Wide, Parts Obsolescence Solution

- **Level 4:** Embrace Industry-Wide Open System Architecture

Needs Assessment Phase

The first step in developing any parts obsolescence solution is to conduct an in-depth needs analysis. IHS consultants evaluate the client's existing IT systems, applications, business processes, product development environment, short- and long-term goals — all the information needed to develop a blueprint for the final parts obsolescence solution. The needs assessment phase is critical for developing a solution around existing processes and IT infrastructure, without starting from square one. It also helps IHS determine where the client is currently with integrating a parts obsolescence solution so a logical placement into the appropriate "level" can be achieved.

Level 1

Access to Comprehensive Parts Data

The primary step for a client in need of a parts obsolescence solution is to subscribe to one or more of the IHS extensive parts information databases. Using data sources from IHS, manufacturers can quickly find alternatives for obsolete electronics parts across numerous databases and vendors, as well as the commercial, industrial and military sectors — all from an Internet browser.

To use an IHS database, the subscriber simply enters pertinent part information. The system then returns information such as part alternatives, manufacturers, and distributors — even contact information for ordering the replacement component. And because these databases are online, clients have access to the most accurate, up-to-date parts information available.

Haystack® Gold

A comprehensive parts and logistics management system, Haystack Gold offers access to information on over 100 million items in the U.S. Federal Supply Catalog and related government and commercial databases. Using Haystack Gold, engineers can locate a part number, determine its manufacturer, research past award histories, conduct competitive analyses and identify alternative sources of supply. Haystack Gold also includes information on over 25 million procurement histories, helping companies quickly find more readily available parts.

4DOnline

4D Online provides Internet access to the most complete and current collection of information on electronic components, with access to technical information on millions of unique electronic components from the world's leading manufacturers such as detailed part attributes, current and historical manufacturer documentation and expansive component replacement solutions for semiconductors, passives, electro-mechanical and connectors. Side-by-side comparisons and up-to-date part lifecycle information ensure that the best component selection decisions can be made quickly and easily.

Parts Universe

Parts Universe allows online access to all aspects of product critical component information, including component alternates, part status, manufacturer documentation, datasheets, application notes, timing diagrams, environmental content attributes and PCNs - directly from the IHS Electronics Database. Parts Universe also provides direct access to analytical predictive lifecycle information and alert part notifications, allowing users to proactively identify and quickly minimize lifecycle and RoHS compliance management challenges, accelerating ROI. Parts Universe additionally provides critical information about hazardous materials that are controlled by the RoHS European Directives.

CatalogXpress®

Delivering the world's most comprehensive collection of manufacturers' catalogs, CatalogXpress contains over 300,000 catalogs from over 16,000 manufacturers. Researchers can locate product and component information by keyword, brand name, part or model number, standard, National Stock Number (NSN), Mil Spec and manufacturer name. Using CatalogXpress, engineers can view descriptions, data sheets and technical specifications as described by the manufacturer.

IHS Specs and Standards

The IHS Specs and Standards service provides quick access to standards, specifications and technical documentation required for meeting industry and government quality regulations. This comprehensive resource includes over 568,000 industry standards documents written by some 450 organizations. It also references 410,000 active and historical U.S. military and federal documents. The IHS Specs and Standards solution is fully integrated, combining old and new

specifications for a system that has been modernized due to obsolescence. Users benefit from seamless access to the specifications and the parts to which they relate.

Engineering Sciences Data Unit (ESDU)

ESDU contains validated engineering design methods, empirical and theoretical data, equations and worked examples presented in over 1,250 design guides with supporting software. ESDU is the result of more than 60 years experience of providing engineers with information, data and techniques for fundamental design and analysis on topics ranging from aerodynamics of leading-edge devices to principles for designing against metal fatigue. With ESDU, engineers have a robust resource to guide them through the design engineering process, which is critical to successful, proactive Diminishing Manufacturing Sources and Material Shortages (DMSMS) planning.

IHS Fasteners eCatalog™

The IHS Fasteners eCatalog is an online application that provides decision support for the identification, specification and sourcing of Aerospace & Defense standard fasteners/hardware such as bolts, screws, nuts, washers, rivets, studs, etc. It helps design engineers find the correct fasteners for their designs in a matter of just a few clicks, eliminating manual searches that can often take hours, days or even weeks.

Having easy, online access to the breadth of IHS parts information saves valuable time as well as considerable cost. By giving engineers an exhaustive search of what's available in the marketplace, manufacturers can find viable part alternatives rather than resorting to the expensive redesign and recertification processes.

Level 2 Tools That Help Consolidate and/or Interpret Parts Obsolescence Data

While the first approach simplifies the process of searching across the hundreds of thousands of parts manufacturers, sources and industries, users are still required to access the IHS databases as individual entities. The next step toward a complete parts obsolescence solution is to consolidate the searching effort so that several databases can be accessed simultaneously for easier and more efficient data analysis.

IHS has several off-the-shelf and web-based database tools that contain excellent data searching and

compilation functionality. These applications are in a single- or multiple-user environment, taking the IHS powerful parts data to a higher, more analytic level.

IHS infoDART

The infoDART is an application that creates instant links to the industry's most in-depth online database application for locating and identifying defense, electronics and aerospace related parts, assemblies, manufacturers and supplier details. With infoDART, document numbers, part numbers, National Stock Numbers (NSNs)/National Item Identification Numbers (NIINs), vendor names or CAGE codes can be targeted from within most any Windows® or Web-based application instantly, without having to key in the information.

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BOM Optimizer

BOM Optimizer examines the supply-chain viability of component and supplier information in an organization's existing AVLs/AMLs (approved vendor/materials lists) or BOMs (bill of materials). This IHS solution delivers a customizable web-based technology tool for manipulating and managing AVLs/AMLs and BOMs. BOM Optimizer focuses on the cleansing and verifying of part numbers and manufacturers. The BOM Optimizer tool allows component engineers and buyers to:

- Upload a AVL/AML or BOM parts list into the BOM Optimizer for analysis, cleansing and reporting against the Parts Universe Electronic Database. The BOM Optimizer data upload capability allows for Excel, .CSV, or delimited file formats to be loaded. Internal decision support information can also be uploaded and mapped into the BOM Optimizer tool for side-by-side comparison with the IHS Life Cycle Supply Chain and Environmental Compliance data, creating a powerful single comprehensive analysis view.
- Automatically cleanse an uploaded AVL/AML or BOM against a Manufacture Name and electronic Part Number Rules Engine.
- Manually cleanse unmatched manufacturers names and part numbers against the Parts Universe database for verification and data cleansing.

- Automatically monitor and Alert (via e-mail) uploaded AVL/AML or BOM matched components for Product Change Notices (PCNs), End Of Life (EOL) notices or Status changes. This allows for proactive monitoring for heads-up Alerts supporting Last Time Buy or alternate source selection decisions, before the component or alternate sources are no longer available.
- Create flexible custom layout views of imported data and BOM Optimizer attributes ranging from Component Life Cycle, Environmental RoHS, component alternates or any combination required for analysis. All discontinued components will be RED and all components with a life cycle of less than 2 years will have a rule of YELLOW. Once created, it is very easy to focus in on and sort components by custom rules, allowing for efficient and time saving analysis.
- Create custom reports leveraging the same layouts created for viewing and analyzing data online into BOM analysis reports. Graphical reports are also available for pie chart analysis for component and manufacturer matching rates.

Level 3

Develop an Integrated, Enterprise-Wide Parts Obsolescence Solution

Because planning for obsolescence is most effective when it is designed into an organization's business processes, the third level of the IHS solution revolves around integrating extensive parts information from all available sources into a single, seamless application.

IHS has experience in designing web or network-based applications that integrate with a client's existing information systems. IHS has developed portal solutions that are capable of searching across disparate data services and providing a collaborative environment for parts obsolescence problems. Or, if a client already has a portal application in place, IHS data can be leveraged into existing systems to maximize technology investments and training costs. The final result? A completely tailored parts obsolescence solution that works within the client's budget, user base, systems, product development, or sustainment methodologies and organization goals.

IHS consultants work with the client to determine the system make-up — what other applications across the organization it should interface with, which data sources need to be accessed, what workflow processes need to be

addressed and of course, basic features and capabilities. While the end product is a completely customized application, some common features may include:

- Heterogeneous data searching
- Intelligent part selection
- Case management
- Integration with other business processes

Heterogeneous Data Searches from a Single Point of Access

At the core of the IHS integrated parts obsolescence solution is the ability to conduct an exhaustive search across heterogeneous data sources. The user provides the part number or parameters for a part that has been identified as obsolete or otherwise non-procurable. The system then builds and submits queries to the various databases that contain that type of part. In addition to offering access to the IHS extensive data sources, this type of parts obsolescence solution can be developed to integrate customer and other third-party content client-identified databases.

Using an integrated solution, engineers are no longer tasked with setting up the necessary protocols required when accessing external data. The system's single point-of-entry login makes access to disparate databases a streamlined, seamless effort.

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Intelligent Searching Produces Improved Results, Faster

IHS assists engineers in selecting parts for new designs, redesign and form-fit-function replacement requirements. This service integrates our authoritative reference parts content and data resident in our decision-support tools described in Level 1, with customer information such as part data, bills of materials, supplier preferences, cost information, inventory and customer operational systems (ERP, PLM, etc). We also provide guided navigation applications to increase efficiency in using information, promote greater speed in locating appropriate parts, encourage reuse of parts and ensure the appropriate life expectancy of parts.

With an integrated obsolescence solution, IHS can enhance the system with a concise reporting feature that allows users to readily compare potential solutions in a single report, making it easier to identify the alternative that is best for the particular case at hand. By delivering a summary of the search results, the system enables less experienced staff to be responsible for parts obsolescence research and information gathering. The end result is a better utilization of in-house resources as experienced engineers have more time for technically demanding issues within the organization.

Integrate Parts Information Throughout the Enterprise to Mitigate the Effects of Obsolescence

The third-level parts obsolescence solution from IHS is a powerful, one-stop tool for locating pertinent parts replacement information. But more than a stand-alone application, the system can be integrated with existing processes and information systems to provide enterprise-wide solutions. Specific applications for the solution include using it as a:

- **Comprehensive, Decision Analysis Tool**
To compare alternative solutions for the original part as well as to each other, based on needed part quantities and time frames, and to serve as a parts pricing and availability resource.
- **Integrated Collaboration Tool**
To give users immediate access to successful solutions found by others. Because the system can maintain a history of the solutions that various users have selected, this list can be retrieved and displayed as part of the search results when users request information on the same obsolete part at a later time. The system is instrumental in linking employees who have experience on specific parts usage with those seeking advice.
- **Workflow Process Tool**
To use the obsolete and replacement parts identified as an automatic trigger for other applications in the workflow (e.g., requisition, procurement, inventory, purchasing, billing). For example, once an engineer identifies a viable replacement part within the system, the part number is verified for approval against the company's linked Approved Vendor List (AVL), the part's product information is uploaded into the CAD system from manufacturer specifications, the number of parts needed for production is

populated in the company's Enterprise Resource Planning (ERP) system and the financial system is prompted to create a purchase order for the parts request.

- **Parts Obsolescence Forecast Tool**

To alert engineers at the time of design that the component they plan to use will become obsolete in the near future and to offer alternative parts that have longer life expectancies.

Level 4 Embrace Industry-Wide Open System Architecture

At the heart of the obsolescence issue is the fact that systems are not compatible across or within platforms. When one component changes or is no longer available, the solution can impact interfacing parts — whether in form, fit or function — and increase the cost of obsolescence solutions. The idea behind open system architectures is that components are interchangeable and are constructed in such a way as to not impact ancillary components and/or hardware in the system or platform.

The government has taken steps in recent years to embed interoperability requirements in its major procurement contracts similar to the following:

"The Air Vehicle architecture shall provide for localization and confinement of the effects of design changes and failures, for the missions listed in Appendix B, such that: (a) design changes in any given element do not force unnecessary changes in other elements; (b) design changes or failures in any given element, or set of elements, do not result in unintended changes or failures across system hardware and software elements; and (c) regression testing of the system is isolated to the structure and partition affected. The contractor shall insure that the AVSI or SAE Standards of interoperability are met and validated."

As the above paragraph illustrates, there is little guidance and few standards or definitions for open system architectures, leaving it to the contractor to interpret the requirement. To help in solving this complex problem, IHS has joined with the Joint Council on Aging Aircraft (JCAA) and the Aerospace Vehicle System Institute (AVSI) to support the definition and implementation of standards that can be implemented on new and vintage platforms in both the commercial and military industries.

Finding Solutions for Obsolete Parts is Now a Simplified, Cost-Effective Process

IHS Enterprise Solutions offers a series of proactive approaches to finding solutions for electronics components that are either obsolete or nearing obsolescence. By identifying various levels of solutions, organizations can get started immediately, putting in place the foundation that can be enhanced and improved upon over time.

About IHS

IHS (NYSE: IHS) is one of the leading global providers of critical technical information, decision-support tools and related services to customers in a number of industries including energy, defense, aerospace, construction, electronics and automotive. IHS serves customers ranging from governments and large multinational corporations to smaller companies and technical professionals in more than 100 countries.

*White Paper compiled by Tim Taylor, Practice Director-
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