

A Strategic Approach to Managing Obsolescence

Overview

This joint MoD, BAE and BMT White Paper, proposes how to take a more strategic approach to managing obsolescence, effectively treat the risk of obsolescence and remove the need to constantly carry out store robberies (STOROBs) from other platforms to maintain availability and capability. This approach also enables the MoD to have increased confidence in costs for resolving obsolescence and be able to transfer Risk Outside Cost (ROC) to Risk Inside Cost (RIC).

This strategic approach is based on the success of an approach developed for Type 45 Destroyers and Queen Elizabeth Class (QEC) over the last two years, which has captured, with predicted costs, obsolescence resolutions required over the next 10 years. This approach is particularly successful where the full Bill of Materials (BoM)¹ is unavailable and would be time consuming and expensive to complete. This approach could equally be applied to other domains e.g. Land, Air, Defence Digital as well.

Obsolescence is the impending loss of production of an asset² or support service.

Declaration of an asset as 'obsolete' must not be confused with the authority to dispose of that asset as the capability is no longer required.

A hardware asset being obsolete may not be a problem if there is not a requirement to replace the asset (e.g. due to failure) or if there is an effective through life support

solution in place (e.g. the ability to repair is made available).

Software becoming obsolete is more complex as the need to update/replace software may come about not only as a result of the inability to make required updates, but also due to:

- compatibility issues due to changes in hardware (e.g. drivers for peripherals),
- dependencies with application software or
- due to security accreditation where software is required to be supported.

What is driving obsolescence?



MoD are heavily reliant on commercial technology including components such as processors and memory, however, this technology is rapidly changing because of advances in digitisation including Artificial Intelligence (AI), the 'Internet of Things' and datacentre/cloud storage, which is enabling new capabilities such as autonomous vehicles. As such, the life cycle of such equipment is much shorter than that of many defence assets.



Environmental protection legislation such as the Restriction of Hazardous Substances (RoHS) Directive and net zero emissions law, is increasingly driving reduced or even complete removal of components and assets that contain hazardous substances. The result is that equipment containing/emitting hazardous substances are being removed from sale and replaced with alternatives.



Economic pressures impact on the viability of manufacturers operating in the defence sector, which may lead to manufacturers going into liquidation or taking commercial decisions to change their business strategy to operate in a more profitable sector.

¹ Bill of Material (BoM) is a list of parts that make up a system/platform

² An asset is defined as an item, thing or entity that has potential or actual value to an organisation

Challenges faced due to obsolescence

A significant volume of equipment within defence assets are suffering obsolescence which is occurring at an ever-increasing rate. Traditional processes for resolving obsolescence are not able to effectively manage these increasing demands, without assets being impacted either by a delay to their manufacture/maintenance, or assets being compromised in terms of support.

For complex systems and equipment, significant time is required to design and accredit the obsolescence resolution and then 'wait for' an appropriate opportunity in the maintenance schedule to implement the change, with the potential to impact on the availability and capability of the asset.

The increased volume and frequency of obsolescence also comes at a cost, which is rarely understood for the life of the asset. This cost not only includes the cost to resolve obsolescence, but also the increasing cost of STOROBs (cost of taking a serviceable component out of one asset and installing it into another asset, as a means of maintaining asset availability).

As such a more strategic approach to managing obsolescence is required.

What is a strategic approach to managing obsolescence?

Traditional obsolescence management practices track assets and their manufacturers to determine the asset's current availability status and, where possible, when the asset will become obsolete, from which the need to take further action is identified. This is normally conducted against the asset's BoM using commercially available tools/services. The approach is very successful at managing assets where substitutes are available and the costs to resolve obsolescence are relatively low.

However, the most significant obsolescence risks in terms of cost and impact on defence assets are those resolutions that will require design change. These changes are required when substitutes can no longer be implemented due to compatibility with interfacing assets or the technology used to deliver a function has been superseded.

An approach is required to manage obsolescence resolutions requiring design

change, as well as substitutes (shown in Figure 1).

The activities to manage obsolescence requiring design change (shown in blue in Figure 1), use the risk assessment process described in BS EN 62402 to identify design changes required to treat the risk of obsolescence, where obsolescence is unlikely to be resolved using substitutes.

Note: where a hierarchical BoM is available for an entire system and each part, following initial filtering, has an obsolescence risk assessment, a bottom-up risk assessment can be used to assess the risk at the system level.

The cost and schedule for each design change (technical refresh) are then estimated factoring in when obsolescence is predicted to impact, and the technical/financial maturity of the resolution. These are amalgamated into a through life technical refresh plan for the defence asset.

Process for a strategic approach to managing obsolescence

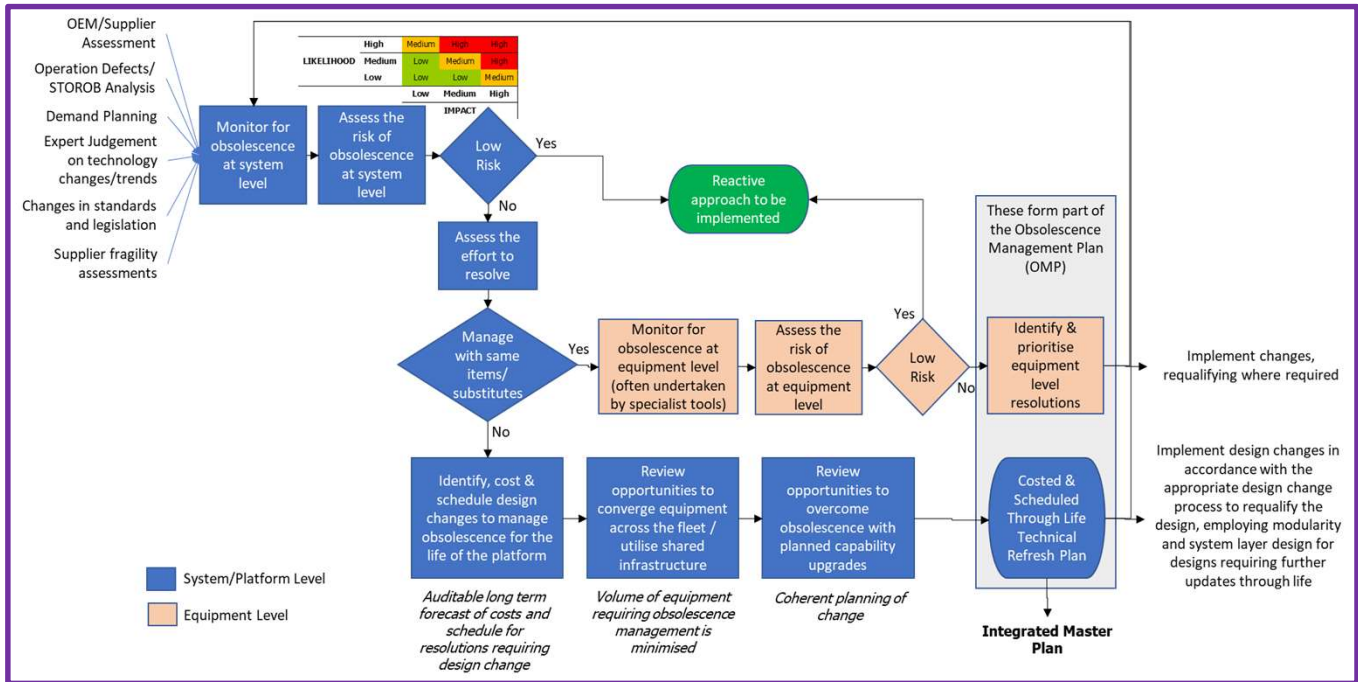


Figure 1: High Level Process of a Strategic Approach to Managing Obsolescence

An overview of all the technical refresh activities is presented in a Gantt Chart (see Figure 2) together with a green/red bar showing when obsolescence is expected to impact. This chart can feed directly into the asset integrated master plan (a high level through life plan of design change on a system/platform) and/or be used to review and align design changes with capability upgrades and changes required to comply with security accreditation requirements. This provides visibility and foresight of both impending obsolescence and the forthcoming opportunity to do something about it and therefore providing an enabler for strategic planning for maintenance and upgrades.

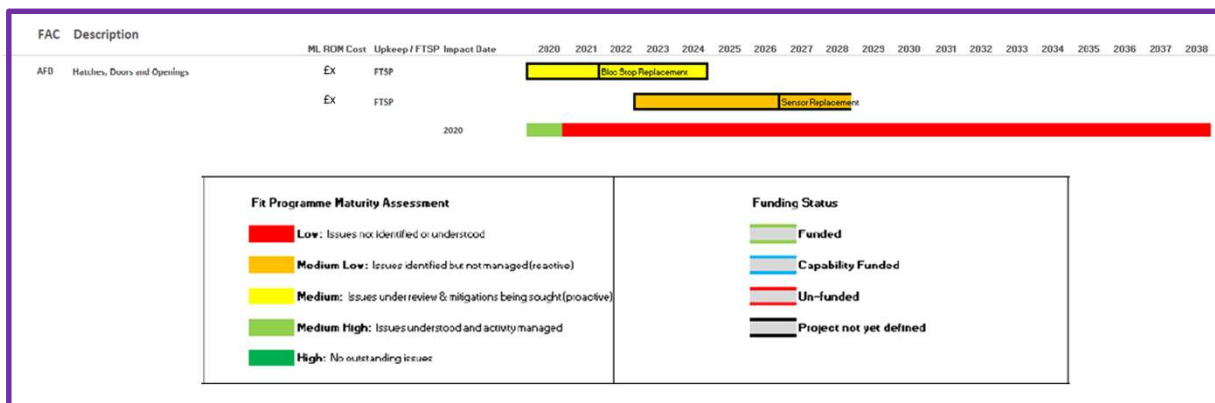


Figure 2: Example of Gantt Chart Output

Other activities within the strategic approach to managing obsolescence are:

- The identification of opportunities to reduce the 'obsolescence burden' by converging equipment across different assets and utilising shared infrastructure within an asset.
- Pan platform/fleet risk management for obsolescence of training facilities, supplier fragility and the effect of legislation changes.
- Designing assets for through life technical refresh and the processes required to maintain pace with technology change (especially for software). This includes implementing open architecture strategies and modular design.
- Tracking and analysis of obsolescence issues that impact the asset, to review trends and identify the root cause of repeat issues.

This strategic approach to obsolescence management seeks to reduce risk due to obsolescence by:

- Reducing the frequency of obsolescence issues arising.
- Reducing the impact of obsolescence resolution through planned technical refresh activities

In accordance with BS EN 62402 these activities are supported by the establishment of an obsolescence management policy/strategy and an appropriate infrastructure/organisation. Metrics are also implemented to measure and improve the performance of the obsolescence management activities.

For the Maritime domain, this strategic approach is consistent with the Obsolescence Management Business Procedure (BP CSM/153) incorporated into the Common Support Model in April 2020.

Benefits from a strategic approach to obsolescence management

Fleet Wide Approach - Implemented by assessing the impact of Fleet Wide Equipment for each class of assets and through the examination of Gantt Chart outputs for the Fleet.

Through Life Approach - Ensuring not only an affordable through life plan that includes a reduction in equipment requiring obsolescence management, but also timely decision making, resulting in resolutions being planned through life and implemented in a timely manner reducing the reliance on STOROBs and increased asset availability and capability.

Reduction in Cost and Time to Undertake Technical Refresh Programmes - As the equipment and change processes have been designed appropriately.

The benefits also align with those of Asset Management including transparent and consistent decisions making, adopting a long-term strategic view and risk-based decision making from a position of knowledge.

The introduction of new technologies not only addresses obsolescence, but can also manage security vulnerabilities, improve system performance, and ensure tactical advantage is maintained to ever-evolving threats. The strategic approach to obsolescence allows all these elements to be addressed in coherent plan(s), to balance investment, and utilise technological advances where it is effective.

Implementation of the strategic approach

The following steps are necessary to implement a strategic approach to obsolescence management and realise the identified benefits:

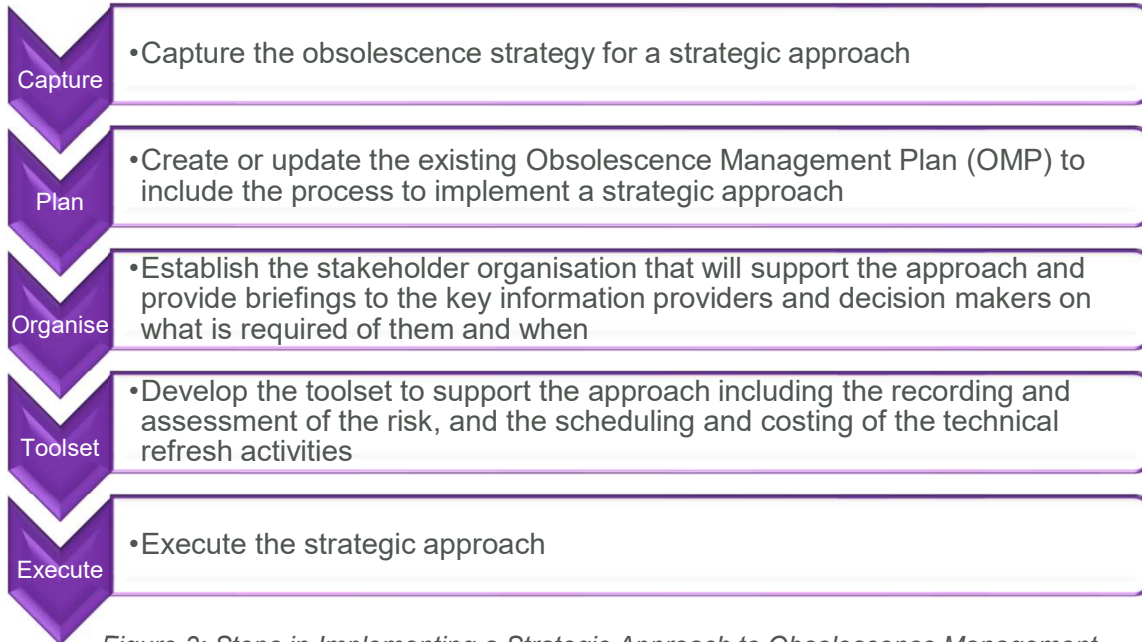


Figure 3: Steps in Implementing a Strategic Approach to Obsolescence Management

Challenges that will potentially be faced when implementing a strategic approach to obsolescence management in DE&S:

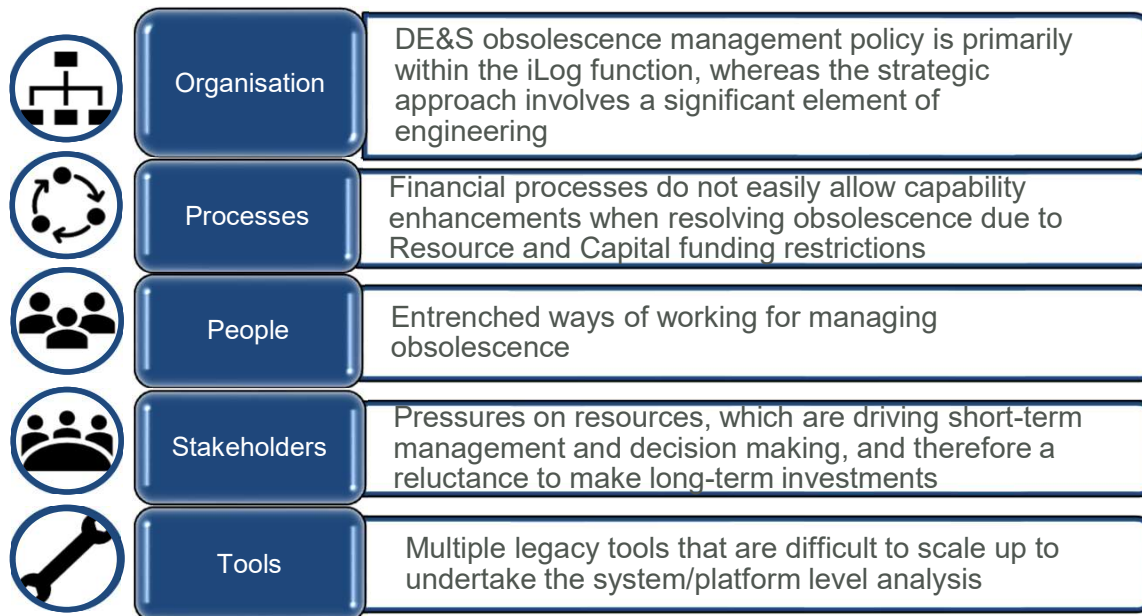


Figure 4: Challenges for Implementing Strategic Approach to Obsolescence Management

Conclusion and proposed actions

This paper introduces a strategic approach to obsolescence management, which complements the upfront incorporation of obsolescence management into design. This strategic approach provides the benefits of a through life, fleet wide approach, ensuring a more affordable through life plan and reduction on the reliance of STOROBs, and increased asset availability and capability.

For Type 45 and QEC this strategic approach is being executed. However, in order for it to be sustainable, a toolset is being developed that DE&S can manage; and the activities within the OMP are being embedded into roles within DE&S.

The following proposed actions are recommended to support the implementation of the strategic approach.

Embed elements of the strategic approach into the Guide for Engineering Activities and Review (GEAR).

Provide best practice guidance for planning technical refresh activities that recognise the benefits to managing obsolescence, capability enhancement, security, and dependability in a coherent way.

Develop a coherent set of tools that integrate obsolescence management activities at equipment, system, and platform level.

Devise methods to work within financial constraints to allow capability enhancements when resolving obsolescence.

Mandate open architecture strategies to implement faster technology refresh rates.

Invest in capability to monitor technological developments relevant to assets of interest.

This paper was produced based on the strategic obsolescence strategy currently being executed on Type 45 and QEC. If you would like to discuss the development of the approach presented in this paper please contact Sally.Derrick102@mod.gov.uk, jo.Hursell@bmtglobal.com or kathryn.seymour@baesystems.com