PROACTIVE OBSOLESCENCE MANAGEMENT

MODELING AND ANALYSIS OF OBSOLESCENCE MANAGEMENT STRATEGIES WITH MONITORING OF THE LIFE-CYCLE STAGES

Due to the market for consumer electronics being very competitive, superior electronic parts and technologies are introduced at a rapid pace, leading to the obsolescence problems. Customers of Royal IHC often encounter obsolescence problems when spare parts are required for in-service assets. Royal IHC sees this as an opportunity for creating additional value to its customers in the form of an obsolescence management service.

CASE DESCRIPTION

We consider a component that is critical for the functioning of a system (e.g. a dredging vessel) in which it is integrated. Anywhere during the lifespan of the system, the installed component can fail, and a spare part is required. It is assumed that there are three obsolescence states for the component (see Figure 1).

In the initial state, the Active state, spare part demand can be satisfied directly from the supplier. When the supplier decides to discontinue the component in the near future, the Phase-out state is reached. In this state, spare part orders can still be placed. Eventually, the component is discontinued and the Cancellation state is reached.

In this research, we consider that the system integrator is responsible from managing the obsolescence issues faced by the asset users. The system integrator needs to satisfy the spare part demand (possibly from its own inventory). If inventory is depleted, a costly redesign must be initiated. To prevent the high cost of a redesign, a Last Time Buy (LTB) order can be placed in the phase-out state. However, suppliers rarely send out discontinuance notifications, and even if there is a

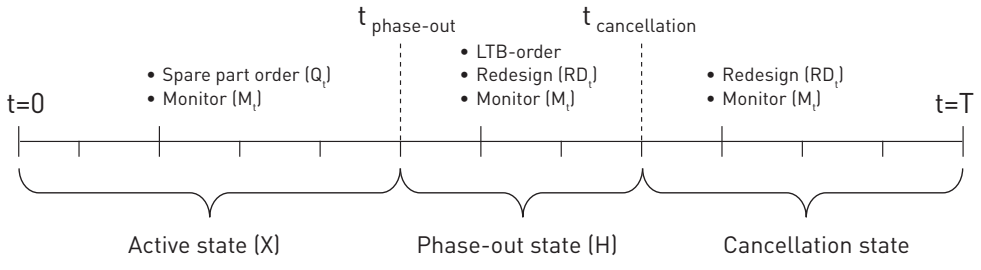

Figure 1. Visualization of the life-stage status for the component and possible actions in each state

notification, it can be late or inaccurate. The system integrator can thus only confirm whether the phase-out state is reached through obsolescence monitoring. The monitoring activity itself is costly.

COMPARISON OF ALTERNATIVE STRATEGIES

A simulation model is built to estimate the total costs incurred during the lifespan of the system under a number of practically relevant obsolescence management strategies. To be specific, three policies are compared: (1) Monitoring the obsolescence issues in regular time intervals and performing LTB as soon as the phase-out state is confirmed (referred to as LTB policy), (2) Never monitoring, and performing a redesign in case the component is needed but turns out to be obsolete, and (3) Never monitoring, and ordering the expected spare-part usage half-way in the planning horizon (referred to as half-way policy). The benefit of accurate demand-information sharing from the customer to the system integrator is also investigated. The main results can be summarized as follows:

- The Last Time Buy policy was the most cost-effective policy in most situations (see Figure 2). However, this is only the case if obsolescence monitoring is applied at the right frequency. This policy was especially able to reduce downtime costs and redesign costs.
- Monitoring rather frequently seems to be beneficial in most situations when applying the LTB policy (see Figure 2). This applies as long as the monitoring costs are substantially lower than the redesign costs, which is almost always the case in practice.
- Accurate demand information sharing seemed to be beneficial for both the LTB policy as for the half-way policy. However, especially for the LTB policy, accurate demand information resulted in major cost reductions.
- Should every system integrate its own specific components, it may not be cost-effective to apply the LTB policy. The reason for this is that it may be expensive to monitor, order, and store all different components. However, when more systems integrate the same components, it will become relatively cheaper to apply the LTB policy. This is in-line with the proactive obsolescence strategy, known as standardization of components.

RECOMMENDATIONS

- Create understanding of obsolescence within the organization. Develop a general statement of obsolescence policies and objectives. Procedures and obsolescence management processes, activities and responsibilities should be clearly documented in an organization-wide obsolescence management approach.
- Obsolescence is a complex issue that may have effect over the whole supply chain. It is therefore important to collaborate with customers and suppliers to share information and work together in dealing with obsolescence issues. Customers should also be involved early in the process in order to figure out the practical challenges they face and what opportunities there are for IHC to step in. Requirements may be imposed on suppliers through a supplier handbook. This all could be facilitated by a communications channels such as a Vessel Service Dashboard.
- Obsolescence needs to be considered early in the manufacturing process. Selection of parts has to be done with future obsolescence issues in mind. In addition to that, standardization of components may reduce total costs and ease the process of obsolescence management.

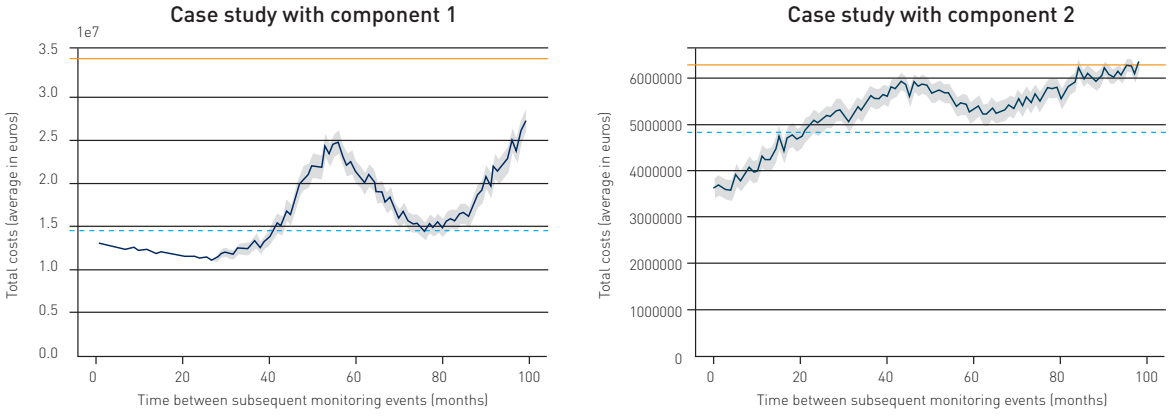

Figure 2. Costs associated with different obsolescence management policies

Topsector Logistiek

FACTS

Researchers	Ward de Kleijn
University	TU Eindhoven
Supervisor	Alp Akcay (TU/e)
	Marc Boer (Royal IHC)

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