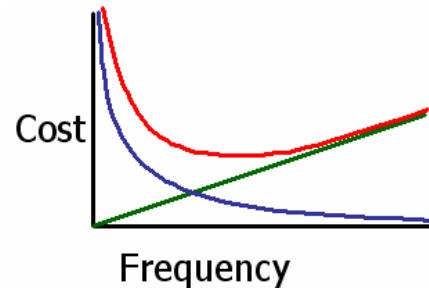


The great fallacy of the cost optimization curve

Developed in the days when we didn't understand equipment failures as we do now, the cost optimisation curve below is still promoted by many, and is embedded into some of the 'improved' RCM software tools.

It is one of the great errors made by those who do not understand asset management and is founded in the flawed assumption that cost is a driver for determining the frequency of a maintenance task.



The basic flawed assumption is that some maintenance is good, therefore more maintenance is better and will make the item more reliable, safer or perform better; something we know is not true. And in the case of items which exhibit Failure Pattern F characteristics, may reduce the reliability of the item by reintroducing infant mortality.

Certainly cost might decide if we conduct the task at all, but to factor in the cost of maintenance to 'optimise' the task *frequency* means that the 'improved' RCM process is flawed and the promoter fails to understand that the task is already optimised.

Consider an On-Condition task which we know is technically feasible if

- we are given some clear warning of the impending or Potential Failure,
- if the warning is relatively consistent, and
- The PF interval is long enough to be of some practical use.

Having established the task is technically feasible, SAE JA 1011 compliant RCM assesses whether the task, conducted at the right frequency, reduces the risk of multiple failure (for hidden failures), reduces the risk to a tolerable level (for safety or the environment consequences), or, costs less than the cost of the consequences (for operational and non-operational consequences).

So what is the correct frequency? Clearly the task must occur as some fraction of the PF interval and to minimise cost, we probably want to conduct the task as infrequently as possible. So, if the task is conducted, and conducted at the minimum frequency, then it is reasonable to argue the frequency should be half the PF interval. The task is therefore already optimised and to change the frequency of the task by extending the frequency and therefore ignoring the PF interval simply to reduce cost, contradicts the logic we have applied to establish the PF interval and increases the risk that the task will not manage the failure.

In the case where the consequences are particularly severe and the task is less than 100% effective, there may be an argument to increase the frequency of the On-Condition task to increase the probability that the potential failure is identified. But these mathematics are based on managing the probability that a task is effective; it is not based on the flawed premise that more maintenance will reduce the probability of equipment failure that the optimisation curve promotes.

Consider now an age related failure. A task that will effectively deal with an age related failure must occur as the item reaches the end of it's Useful Life. If the Useful Life is known then the optimised cost of maintenance is when maintenance is conducted at the point that is the conclusion of Useful Life. Again the cost of the task is already optimised.

For safety and environmental consequences, the argument is as above but, because of the consequences of failure, it makes even less sense to change from the already optimised frequency of the task.

And finally, for hidden failures, the tasks frequency is determined based on the reliability of the protective device and the risk we are prepared that the multiple failure should occur. To change the already optimised task to reduce costs again ignores the logic we have applied to developed the Failure Finding Interval. The argument provided by purveyors of 'improved' RCM processes is that they are improving the process to take into consideration cost.

The SAE JA1011 RCM process more than considers cost, it optimises your decision to give that unique balance between asset performance, cost and risk based on your specific operating context.

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