

Risk Management Strategies: Chicken vs. Ostrich

David Albrice, March 20, 2015



“Worry is the interest you pay in advance on a debt you may never owe” — Keith Caserta.

There is an old folk tale in which Chicken Little worries hysterically that the sky is going to fall. This is an example of excessive and unreasonable worrying about something that is not likely to happen.

On the other hand, we have all heard the urban tale of the ostrich that buries its head in the sand at the first sign of trouble in the hope that the consequences of what is actually happening around it will somehow disappear. This is an example of not worrying enough about something that is very likely to happen.

Chicken Little's hysteria and the ostrich's apparent obliviousness help to illustrate two sides to risk: the likelihood of something happening and the consequences when/if it does happen.

Enough of chickens and ostriches -- let's put our feathered friends to the side for a moment.

In Asset Management, risk is the correlation between the Probability of Failure (PoF) and the Consequence of Failure (CoF) for each of our assets. For example, what is the probability of our roof

reaching the end of its useful life within the next year and, if it does, what will be the impact (such as leaks into our building)?

This relationship of PoF to CoF is not about abstract concepts - it is very important stuff. It helps us get prepared, it helps us know what will happen if we procrastinate, it helps us to mitigate risk, and much more. Let's dig deeper.

1. Probability of Failure (PoF)

What - The likelihood, based on realistic forecasts, that an asset (such as a roof or boiler) will reach functional failure ("F") at a future point in time (usually within a particular calendar year).

It's all about *proximity* - how far away is it in terms of months, years or decades.

Why - We all want to stretch our dollars and delay big ticket items. As owners we want our assets to reach their full useful life or to extend/prolong their life as much as possible. If we are proactive, we want to be prepared before the failure occurs. We want to avert (prevent) the consequences.

How - Probabilities are usually expressed as distribution curves. I don't want to bore my readers with too much stuff about statistics (mean, median and mode). Regardless of the mathematics, probability can be expressed in a variety of linguistic scales (such as low, medium, high) or numerical scales (such as 1-100) relative to a particular year. Listed below is an example of a five-tiered linguistic scale:

- Impossible
- Extremely unlikely
- Remote
- Possible
- Probable
- Very likely

For example, it is "highly likely" that our roof will need to be replaced within the next two years. It is "extremely unlikely" that our transformer will need to be replaced for at least another 20 years.

Tools - There are a variety of tools and techniques to help us establish the probability of failure and to manage the process, which are addressed in more detail in other articles. For more information please read the article entitled ["Reaching" Life or "Extending" Life](#) of assets.

2. Consequences of Failure (CoF)

What - The result of an asset reaching functional failure ("F"), which is measured as the significance on the following two entities: a) the building and b) the owners and other stakeholders.

It's all about *impact* – how bad will it be?

Why - We do not like unfavourable surprises. If we are reactive, we will find ourselves managing the recovery of the failure. It is much more expensive to pay for recovery than to pay for prevention.

How - The severity of consequences can be ranked as linguistic variables (low, medium, high) or numerical values (1-100). Listed below is an example of a four-tiered linguistic classification:

- Tier 1: "Catastrophic"
- Tier 2: "Critical"
- Tier 3: "Marginal"
- Tier 4: "Negligible"

"Catastrophic" consequences would include matters such as loss of life and injury to persons. "Critical" would include significant damage to the building and components. "Negligible" would include small aesthetic issues, such as scuffed paintwork on an interior wall.

In an earlier blog titled [Gambling with Deferred Maintenance](#), I provided a long list of the various consequences of failure, which was organized into financial consequences, legal consequences, physical consequences and political consequences.

Tools - We manage consequences by prioritizing our work based on the severity of what negative things may happen. More details are provided in the article titled [Urgent vs. Important](#).

3. PoF x CoF = Risk

In a nutshell, we need to decide whether we want to spend more time and money on managing the probabilities of failure or the consequences thereof. In other words:

- **PoF = Prevention** -- through maintenance and preservation we manage the proximity of the event.
- **CoF = Recovery** -- through repairs, rehabilitation and renewals we manage the impact of the event.

With some assets it may make sense to let the asset run to failure and deal with the consequences when they arise. However, there are some assets where this a very dangerous gamble. Ultimately, we want to find a mix of risk management strategies to apply to different assets. We will address this in an upcoming blog on Sweat-the-Asset.

In upcoming blog posts we will look at some powerful tools to manage risk, including:

- Reliability-Centred Maintenance (RcM)
- Risk-based Maintenance (RbM)

Please don't hesitate to share your comments so we can all learn from each other.

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