Decision making with little information.

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Complaints, complaints and complaints is what we here sometimes. ‘There is not enough data available. How can I perform good analysis and get to proper decision making?’ Because making decisions with uncertainties is a profession[1], there is a solution.

There are many causes for having not sufficient data. Assets often are relatively old and when the assets were built, there were no automated systems to capture the static object data. Or in the use phase modifications are made, but the contractor has never supplied the as-built data. And if that was supplied (often on paper), the people were not available to convert the data to the IT systems. Also, many asset intensive companies went through many mergers and acquisitions. After a merger or acquisition, it is often not clear where the fixed asset information was stored (e.g. after removals old paper archives could have disappeared). Because the static object data from the past is not stored, the dynamic maintenance data can not simply be linked to that object data. Think of hours worked, the planned and unplanned outage duration, the amount of purchased materials, type numbers of consumed articles and hired suppliers to mention a few. Also, for failures it is often not well recorded what the root cause of the failure was.

However much knowledge is available. It is then `in the minds’ of the workers and not in physical databases. And also many of those employees will leave the organisation the coming years. A small disaster seems to arise .....

Despite these shortcomings, some asset managers (fortunately) tend to be pragmatic. Even with only 80% of the data available, they can make the right decisions. Nevertheless, the desire in the industry is to get more and better data (this is one of the causes why on-line monitoring systems have received much attention). That in itself is not so strange. Generally people with a technical background have a relatively large need for security and certainty. And in seeking this they sometimes find support by means of standards. ‘The standard states that we must do something!’ as it sounds.

Asset management standards indeed set demands on the management of information. The Dutch industry asset management standard NTA8120 for example suggests that an organization must have procedures for the management of data and information. It for example states that the completeness, accuracy and timeliness of data in the system(s) should be taken into account. The standard does not prescribe how complete and reliable the data should be. So one should think about this. And it is the Asset Manager who should do this.

To deliver a better performance with the same budget, generally more and better data is needed. But that is not the same whether the available data is maximally applied. Moreover, the collection and management of data also costs money and thus is a separate asset management decision.

In this context it is also strange that asset performance models are not widely used[2]. With these models the main cause of a problem can be found for example (e.g. methods such as fault tree, event tree, reliability block diagram and FMECA analysis). When these methods are combined with a sensitivity analysis, it quickly becomes clear which causes have a dominant influence and which have not. This is important because if a problem is clear, the solution is near.

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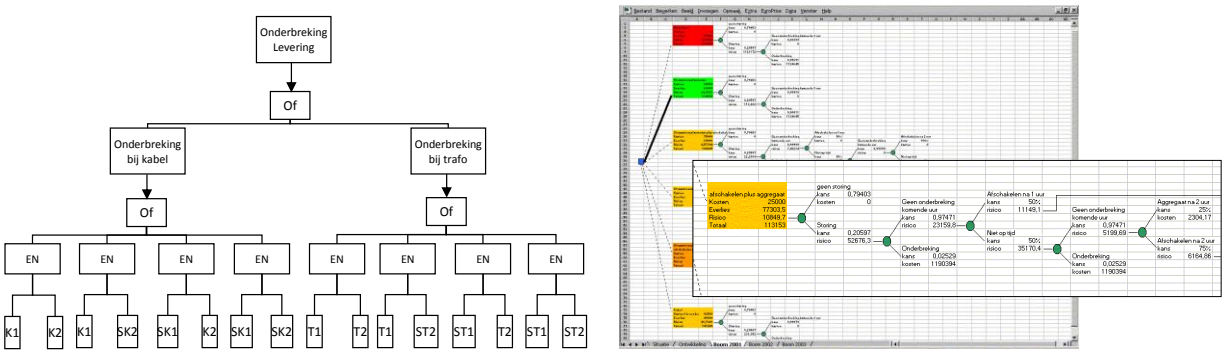
[1] See column ‘Beslissen is een vak’ (decision making is a profession). http://www.assetresolutions.nl/nl/column/beslissen-is-een-vak

[2] See e.g. ‘The state of asset management in the Netherlands’. Ype Wijnia en Paulien Herder, Delft University of Technology. This study was performed by Next Generation Infrastructures (part of Delft University of Technology)



Examples of a Fault Tree (left) and Event Tree (right)

Most asset managers rely on historical data. As indicated above, it is sometimes difficult to get historical data. What is stopping you from 'getting' that data? Literally get the people who work on and with the technical assets at the table. Invite them to actively contribute to risk analysis sessions. Ask them when the system failed and what the cause was. Let them also make clear what the consequences were. Often this gives stunning results! In sessions you hear for example 'I work here for 25 years, but never has anyone asked me for my opinion.' These people really like to provide their knowledge. After all, everyone wants to be appreciated.

As asset manager you strive after 100% good data, but it is clear that this does not make much sense. If data is related to a component which has little influence, that data does not offer much value. The problem is that you do not always know in advance which entities have a large impact on system performance and which have not. This is a dilemma: a company wants information on the future, but that information is by definition not available right now. That is a fact and therefore an asset intensive company must live with it. It will be easier, when the asset performance models are applied with sensitivity analyses and information from the field.

So do not only look at the data itself, but also what can be done with it. Thereafter, the precise information requirements can be defined. Then think about what information should be recorded. Do not strive after 100% perfection but be pragmatic. Involve people from the field! While it is possible and they are still in service .....

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