Making sense of inspection and testing data

Axiom Engineering Associates Ltd
Maximising Assets - Minimising Risk

Axiom Engineering Associates has been serving the high hazard process industries across the UK, including key operators within the North West, specialising in Asset Integrity Management. During the Covid pandemic, economic conditions have proved more challenging than we could ever have imagined, with the need to delay capital spend and closer scrutiny of assets approaching or exceeding their original nameplate life.

The interest in Big Data and data analytics has increased dramatically and the challenge is, as always, to extract meaningful information from this data. In the process sector, such information has value because it can – amongst many other things – be used to postpone capital spend or extend the life of assets, but how do you set up systems to support the extraction of meaningful information? Axiom's best practice suggestions may help you:

Decide what questions to ask
It is impossible to decide exactly what questions to answer at a later date, however it is possible to identify particular themes or areas that you may be interested in knowing about. These may include the remaining life of a set of particularly vulnerable components, or the risk of a particular damage mechanism throughout the asset fleet.

Decide what data to collect and think about the marginal cost of obtaining it
Collecting the underlying data that can yield high value information is expensive. Significant costs can be incurred during collection, extraction, or potentially, both. Focusing on the data you need, to provide the answers you want, will enable you to get the best value out of this exercise.

Decide how to structure your data
Humans look at things differently, interpret data and report differently. This is dependent on skills and experience, and also the environment an individual was in at the time the work was carried out. Studies such as the Programme for the Assessment of NDT in Industry (PANI) highlighted how human factors can affect technicians' ability to successfully test components for defects. Deciding how to structure your data allows you to minimise mistakes.

Make your data structure clear to those collecting it
If field technicians collect data but in the wrong place or take the wrong sort of data then this will skew the results. If you indicate what data is important and how it should be recorded then this can give you a more consistent picture.

Sanitise your data, assign metadata correctly and reclassify it where you can
You will be collecting data from a wide variety of sources over a long period of time. It is significantly easier to process if you sanitise it on the way in. Low quality or low confidence data can be tagged as such or discarded. Having a consistent system for categorising data is key.

Understand, establish and record measurement uncertainty
When establishing slowly varying trends to determine equipment life, shortfalls in the accuracy, precision and repeatability of measurements can be so significant as to make such measurements meaningless when attempting to calculate retirement dates. Unfortunately, historical measurements (and even current ones for field work) do not record the uncertainty of measurement. Understanding how significant this is, will help you with your decision-making and also help you define the data collection requirements discussed.

Look for bias in your data or methods
If you are looking for a particular answer in a vast pool of data, it is quite easy to find the answer you want. You may be unconsciously compromising your objectivity in the method you devise. Look for bias in your methods.

Don't underestimate the time (and cost) of analysing your data
Data gathering, selection, sanitising and extraction takes the most time. The goals of your project need to be understood to focus your time and costs incurred. It is also possible that little meaningful data will be gained but if you have structured how you collect data then you will give yourself the best chance at the review stage.

Conclusion
Inspection and testing data is paramount to assured decision-making on critical, capital intensive plant. Axiom is ready and able to support our North West client base in unlocking the hidden value from their plant data, and capitalising on the associated business benefits.

For more details please see
http://www.ax-ea.co.uk/
or contact: + 44 (0)1642 732745
or email: info@ax-ea.co.uk