Fact sheet – Non-routine work

Introduction

If I had a penny for each time somebody tells me that it is impossible to plan for defects as they are unpredictable, I would be a millionaire. It is also not true, defects are more predicable than you might realise – everything, once you understand the pattern can be forecast and over time you can make your forecast increasingly accurate.

McDonalds

Stepping away from the world of maintenance, McDonalds serves roughly 68million customers per day, 1% of the world's population! It is fast food of an acceptable quality, we arrive we order, and we want to take our food away, reasonably quickly – we don't want to wait for it to be cooked, we expect it ready and waiting for us when we walk in. So how does McDonalds predict when people are going to be coming into the shop to buy their food. There's a lot of chicken nuggets going to waste if they can't. Many factors determine our buying behaviour, the weather, the time of day, the day of the week etc. One might describe it as highly unpredictable!

However, over several years McDonalds have collected and trended this buying behaviour data and have reasonably accurate forecast models for the demand for food. For example they can model that on a [say] Friday on a rainy day the demand for BigMac® is going to be 32.5 at 11:30 to 11:45. Knowing this means they can stock load the previous day and start cooking them in anticipation; meaning that when we arrive we get freshly cooked food fairly quickly. We leave satisfied, tell more people and so on. They have recently added in Artificial Intelligence that allows them to predict behaviours, as well as scanning for the local football matches and other sporting events. They are even trialling number plate recognition technology to help speed up the drive thru process.

Using all this data has enabled them to increase sales *and* reduce costs (waste food mainly) in what is a highly unpredictable market. So why can't the maintenance planner use a similar approach and use previous defect data to trend and generate a future forecast of defect (and work arising) loads?

Data Inputs

The key to predicting non-routine work is gaining good control of your maintenance data, and using it to release you from outdated models of defect management (wait until it fails and fix it). The biggest single problem we always encounter is that of data accuracy, and often it seems too big a challenge for management to tackle. It is big, but tackling it step by step will achieve the results, gain accuracy and release the potential you have.

The first area to control is in the raising of the defects (and work arising etc) onto the asset management system (AMS).

Every defect card raised should have:

- The task
- Time to rectify
- Materials
- Manual references

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Experience over years has taught me that no matter how hard you try to enforce the input discipline, it often slips, and you end up with a work card on the AMS without materials ordered, or with widely inaccurate labour hours. Many reasons exist for this but the biggest is that often defects are raised in somewhat of a rush, the task is entered, but many of the other details are missed.

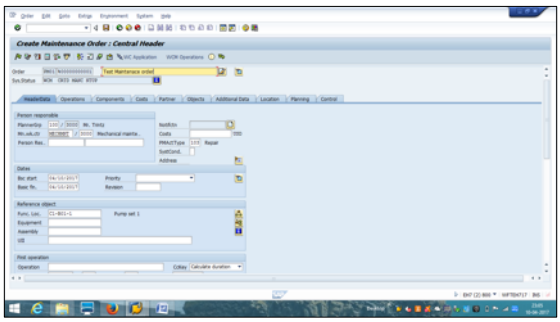
Either have an analyst going behind and scooping up all yesterday's defects raised, and checking them for hours and materials etc., or try and enforce stronger input discipline.

Another area that is often overlooked is that called perishable data; the data that the technician or engineer reporting the defect can know but is lost very rapidly. Items such as rail head condition, weather on the day, mode of operation. This data is very helpful in helping the production teams rectify the defect first time every time and needs to be captured. One approach is to have a decision support tool for the technician – a simple flowchart that when the driver calls in the defect, helps the technician identify the fault and collect the data more accurately. You are still left with the challenge of stopping that technician scribbling it down on a pad somewhere and inputting it into some shared information system.

Defect database

One of the best ways of standardising the defect raising activity, providing the planner with all the relevant information AND making it quicker to raise a defect is that of a defect database.

Typically most defects that occur are common, often we find the top 20 defect types account for 80% of the total defect numbers; discovering this enables us to start predicting things. A defect database is where in your AMS you pre-engineer the 'top 20' defect cards as 'blank templates' then as they are raised the technician simples calls the template and identifies the component – it reduces time to raise a good job card from minutes to seconds; and importantly it gets all the relevant and accurate information.



Which AMS should we buy?

This is a very common question we get asked, and certainly if we were talking with you we can discuss some of the strengths and weaknesses of all systems. All are well-built and many these days are cloud hosted. Generally, the more you spend the more comprehensive the system becomes allowing more complex analysis and data collection.

Call us if you need more advice.

One thing we definitely recommend against doing is using Excel or Access. Over the last 20 years or so Microsoft have built a very capable range of software that is presently bundled in their Office365® package. Because they have been around for many years today's engineers have grown up with them and often understand them very well; and can do some very clever things with them. This can lure you down the path of using an internal specialist on Excel for example. Beware!

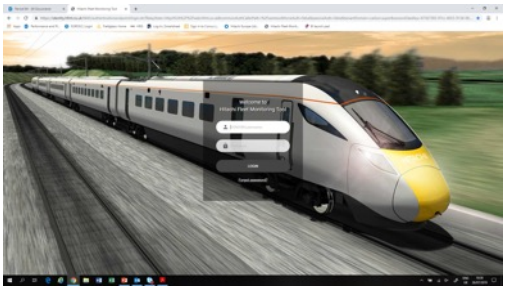
Consider not just today's problem, but tomorrow's opportunity. An AMS becomes a business critical system very quickly and having such a criticality on an unsupported system is a significant operational

risk that in our opinion is not worth bearing. Additionally, Excel is not great at being a shared tool and so what starts to happen is we generate lots of local versions, and we are moving away from the signle source of the truth.

A 'new kid' on the block and a different approach is SOROS, developed by a small but growing company called Danburykline it is a very different way of working. Essentially it looks at the workflow rather than the data management itself, interrogating any AMS collecting and writing data back and forth. I suspect it is only time before they add a full AMS module. A very user friendly system and worthy of closer scrutiny.

Technology

Today there are many good systems that help us predict and manage defects better. Remote Train Monitoring (RTM) is a significantly powerful tool for helping maintenance management – when used properly. There are many systems on the market, all work ostensibly in the same way by measuring discrete and variable data around the vehicle and transmitting this to a line station for collection. Typically doors are a high defect item on rail vehicles and most RTM systems measure door actuation times – by applying some brain-power to the problem we can see where a door is starting to 'struggle' and then plan that unit into production for rectification.



Greater Anglia case study on our website in the GS05 material shows how one operator is using the technology. The key thing is the application – how are you going to use the technology to reduce cost for example; without the application, sadly it becomes a 'technical toy', good for seeing where trains are, but not much more than that.

Automatic Vehicle Inspection System (AVIS) is another piece of technology that can significantly reduce the time we spend on maintenance – when it is applied properly, which is Planning's role to drive and lead. AVIS uses lasers to measure many parameters such a tread depth, pan-top wear, brake pad wear etc. There is data in aplenty here to help the planner schedule a more effective maintenance plan.

Measuring non-routine work management effectiveness

If as a maintenance organisation you can gain control of your non-routine work you will gain a strong reliability curve as there is a known correlation between defects and reliability. Therefore, gaining control of your management and measuring success is an important, and sadly often overlooked, element of defect management. A well-managed defect system can help you:

- Predicting – forecasting defects
- Repeat defect management
- Reducing maintenance on systems that never fail
- Intelligent adaptation of the maintenance schedule
- Improve reliability

What to measure is the first question we are normally asked. There are a few simple things to measure as part of the weekly 'beat-rate' meeting that is part of the planning cycle; then there are more detailed analysis that can be performed on a periodic basis as the data set grows. At a weekly level you should be measuring the raised and cleared rate, and often it is helpful to narrow this to category 4 and 5 defects rather than the more easily managed 1 and 2. Overall defect numbers might also be a measure to track.

In our fact sheets for GS05, there is an executive pack with some examples. Most always these need tailoring depending upon fleet usage rates, and type of operation. Call us if you need help in this complex set up.

The fallacy of bookings

I wanted to end with a word on bookings. Some people have a fascination with bookings and with all KPI it is important to consider what behaviours are driven from managing the KPI. A booking system works (in theory) by the technician booking onto the job at the start of it, and booking off at task completion.

There are some challenges with this in terms of controlling maintenance. Firstly booking discipline is always poor – the best I have witnessed is around 50% accuracy. Many reasons exist for this:

- Sometimes laziness, the technician doesn't book on as the task is seen as more important
- Can't get to computer to log on
- Tablet doesn't link to the Wifi
- Technicians often book onto several tasks at once, skewing the data

The more accurate and fool proof method is to have good labour hours loaded onto the task, then as the technician completes the task on the system, those hours get 'banked' on the shift. Summating the hours off all the completed cards for the shift gives you an accurate picture of hours completed. If we then measure productivity we can see where waste is occurring. It is a more accurate method of measuring performance, rather than time taken to complete the task.