

Introduction

The efficiency of any system is a by-product of both the people that work within it, the facilities and the process is that bind those together. In maintenance, sadly, the process design is often hinged around some form of quality compliance mechanism. In other words, a regulatory requirement is stipulated, and a process is written to satisfy that regulatory requirement, this is a completely inefficient and ineffective way to determine a process. In this short fact sheet we shall discuss how to develop a process but he's able to deliver the type of quality and cost performance, that the business requires.

Process examples

The result desired should drive the process design and in this case let us consider two examples: McDonald's and Rolex. These two organisations have been chosen deliberately as they are on either end of the customer expectation spectrum.

In the case of McDonald's, the product is delivery of food at a fast pace. Often when the question is asked whether McDonald's provide quality produce people reply that they don't, and clearly this is a misinterpretation of what quality means. Quality is about providing something to a specified standard. Is McDonald's fine dining? No, clearly they're not, however most every time one turns up there the food is hot, complete and served in a prompt fashion full. They have a key metric to deliver food to the customer within 82 secs of ordering.



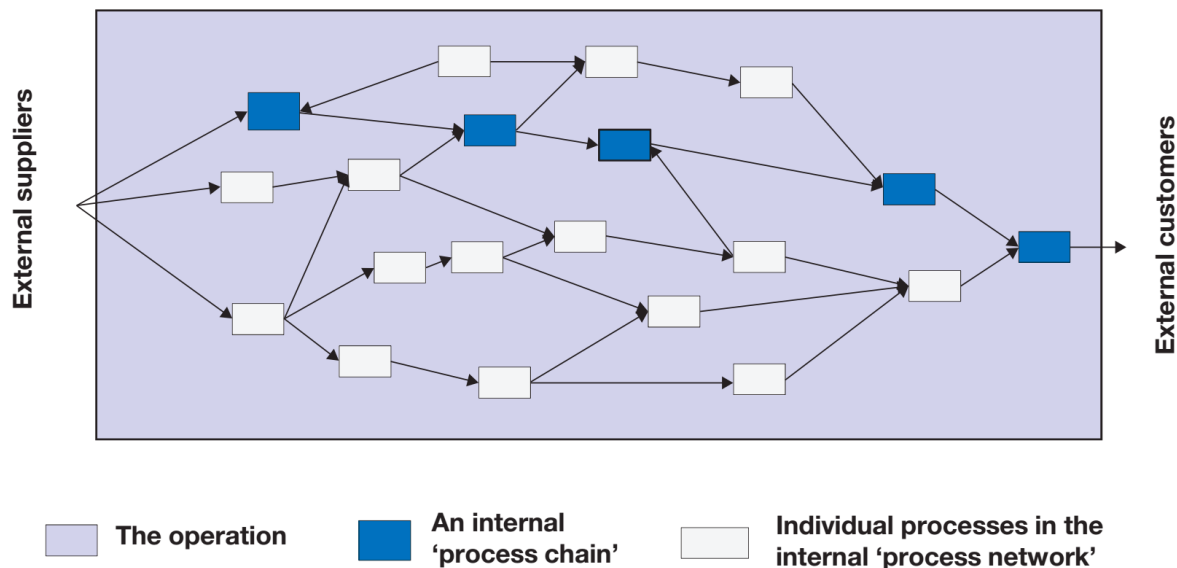
Given the need to produce a standard of food in a shorter time as possible the design of the process is carefully understood and applied. The item that takes the longest to cook, the burger patty, is cooked to some extent in advance and kept warm in a steam draw. The other ingredients are cold and the burger is affectively assembled as one orders, this ensures both speed and standardisation of quality. All the process is around training staff development etc are all geared to delivering fast food.



When considering Rolex, the perception that people hold of the business is one of quality. everything about the product must be of the highest standard and presented to the customer in such a way as to signify high value and high worth. Therefore, every stage of the production process is in a highly controlled environment, and these performed but his staff that have been invested in considerably with training. The retail distribution of the Rolex range is also part of the process of the business, where the buyer who's greeted by a doorman typically and often treated to a glass of champagne upon purchase.

These two organisations are good examples of where the process design is aligned to deliver the output required. A question therefore for all maintenance managers is that “what is your output requirement?”

Designing the process



It is essential in making all networks, including process networks, work effectively. The figure above shows a simplified internal process network for one business. It has many processes that transform items and transfer them to other internal processes. Through this network there are many 'process chains': that is, threads of processes within the network. And thinking about processes as part of a network has several advantages. First, understanding how and where a process fits into the internal network helps to establish appropriate objectives for the process. Second, one can check to make sure that everyone in a process has a clear 'line of sight' forward through to end customers, so that the people working in each process have a better chance of seeing how they contribute to satisfying the operation's customers. Even more important, one can ask the question, 'how can each process help the intermediate processes that lie between them and the customer, to operate effectively?' Third, a clear 'line of sight' backwards through to the operation's suppliers makes the role and importance of suppliers easier to understand. Finally, reversing the question, not understanding how process chains interact can reduce the effectiveness of the whole operation, and increase the risk of disruption spreading. Process chains can become channels for disruption when things go wrong.

Slack, Nigel; Brandon-Jones, Alistair. Operations Management (p. 179). Pearson. Kindle Edition.

The Maintenance Process Design

We have discussed in other fact sheets and during the course about the need to balance service requirements together with high quality maintenance at a cost competitive manner. It is important we consider all three of these as we design our processes as if we just focus on service at the expense of quality and cost, we will have short term service satisfaction but in the longer term we will see reliability and expense issues override.

Often it is seen why organisations almost metaphorically running around the service cost quality triangle. The delivery of service is important in any public transport sector whether that Israel, aviation or automotive, but it is not the only factor that must be considered. In maintenance organisations that have been processed mapped or just organically grown to deliver service and not much else then it is only wonder we run into quality and cost complications in the longer term.

Fact Sheet – Process Design

The design of the maintenance process ideally should start with the design of the vehicle, but in 30 years around all manner of maintenance, that has never happened. That indicates there will always be some inefficiencies in the system and we measure these through productivity, discussed in another fact sheet.

Performance objective	Typical process design objectives	Some benefits of good process design
Quality	<ul style="list-style-type: none"> • Provide appropriate resources that can achieve the specifications • Error-free processing 	<ul style="list-style-type: none"> • Increasing reliability • Less recycling and waste
Speed	<ul style="list-style-type: none"> • Minimum throughput time • Output rate appropriate for demand 	<ul style="list-style-type: none"> • Short customer waiting time • Low in-process inventory
Service Dependability	<ul style="list-style-type: none"> • Provide dependable process resources, such as training, competence, and materials • Reliable process output timing and volume 	<ul style="list-style-type: none"> • On-time service needs met • Less disruption, confusion and rescheduling in the system
Flexibility	<ul style="list-style-type: none"> • Have resources with a wide range of capabilities • Change easily between volume and critical path (exams to defects) • Ability to redeploy the volume workforce 	<ul style="list-style-type: none"> • Ability to process whatever arrives on the depot • Fast to change over from scheduled use to defect use • Ability to cope with unexpected events
Cost	<ul style="list-style-type: none"> • Right capacity workforce to meet demand – strategic planning • Eliminate process waste: <ul style="list-style-type: none"> ○ Excess capacity ○ Excess capability ○ In-process delays ○ In-process errors ○ Inappropriate process inputs 	<ul style="list-style-type: none"> • Low processing costs • Low resource costs, and flexibility in the labour deployment • Low inventory costs (JIT)
Sustainability	<ul style="list-style-type: none"> • Minimize energy usage • Reduce local impact on community 	<ul style="list-style-type: none"> • Lower negative environmental and societal impact

In maintaining public transport vehicles, the need to have a quality output is high, probably higher than many maintenance managers realise as they often get lost in providing service dependability. We stated earlier but no vehicles and not many maintenance facilities are designed with the end product in mind, that being efficient maintenance output. In providing quality maintenance and service dependability it is vital thought the capacity of the maintenance facility these matched to the load that is pushed through it; this is the role of planning and hence why a plan led business is so vital to the future success of any maintenance organisation.

Fact Sheet – Process Design

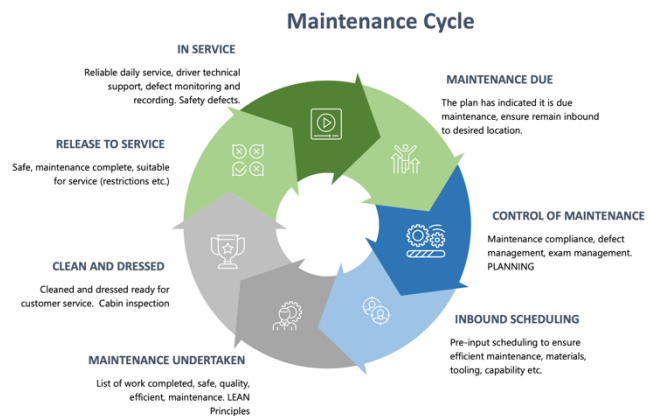
Once you have established the process objectives the designing of the main process is moderately easy. For example, if one is looking for service dependability, we would need to make sure the competence maps of the workforce are clearly defined so that the training teams can ensure competence is provided. Further, the recruitment selection and induction of staff will be driven from the need to have dependable resource. Load and capacity models will be established to ensure that leave, sickness, and training well managed, so that sufficient resource is always on site to deliver the work required.

Most organisations the EngPro work with have never process mapped their organisation, more they have organically grown and that has brought significant challenges. It is entirely possible to retrospectively process map an organisation.

Day in the life modelling

The best approach to building a process map we have found is quite an old-fashioned technique but one that works. Initially we take a big roll of paper and pin it to a large wall onto that you tack your main key processes to. They will track the day in the life of a train undergoing maintenance, often called the maintenance cycle. The key processes are likely to be:

- ◆ Input planning
- ◆ Production delivery
- ◆ Train release
- ◆ Defect and work arising management
- ◆ Concession and restriction management



There will be many other processes required in a complex business but these five will generate what is termed the operating model and as such they formed the nucleus of the entire process maps. Everything in the business should deliver what these processes require and as such the wider the growing process maps are articulated the better.

For example, at some stage during the process map build it is worth bringing in the human resource I'm training teams so that they can see how their process is might need to adjust to deliver the requirements of the business as that is fundamentally what you are developing with the core processes.

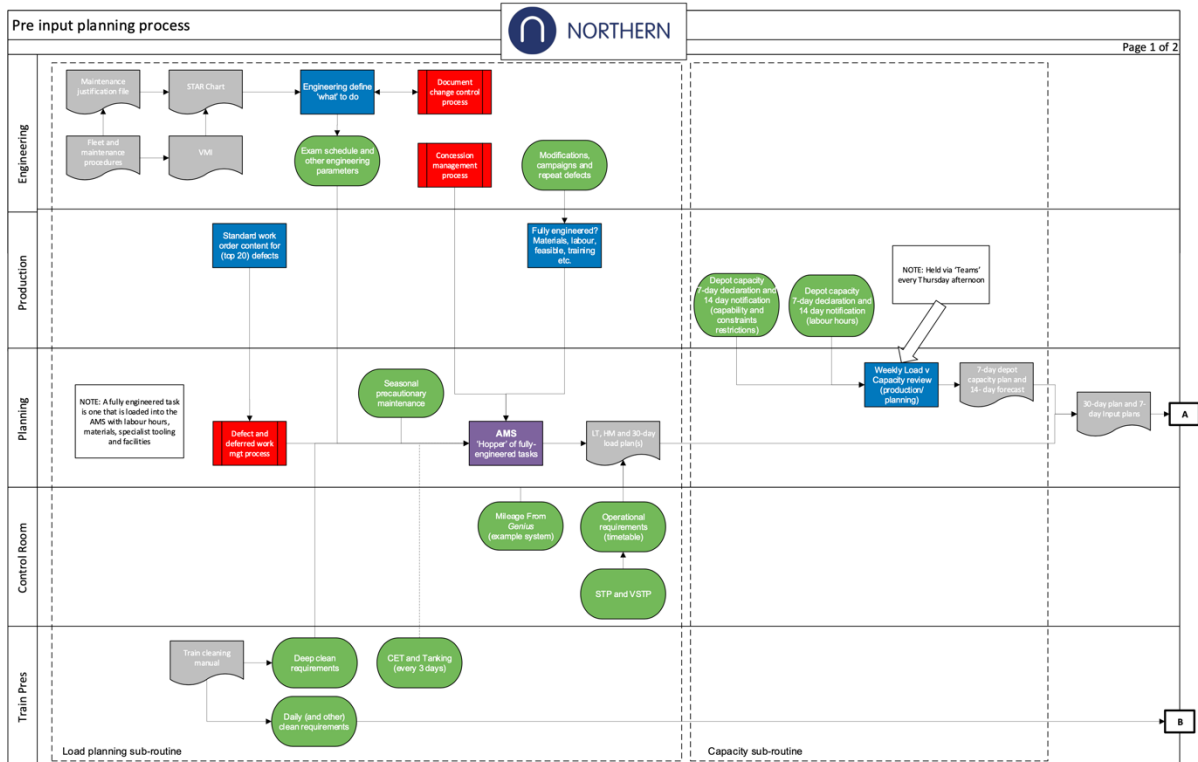


other departments will need to be brought in in quite significant detail, departments such as technical engineering and materials have a significant bearing on the work plan and the load capacity model. Both departments will need to be involved in the planning cycle at various stages to ensure the materials and technical are all aligned in a shared plan.

Fact Sheet – Process Design

Documenting the process

At EngPro we do not advocate wordy processes and procedures, the better approach we have found is a swim lane process map. An example of this is depicted below.



The advantage of a swim lane is that it highlights a role or department and shows their accountabilities and responsibilities to the process, this allows job descriptions to be written quite simply and easily. The challenge with any swim lane process is where a tracking line crosses into a different swim lane because at that point a communication interface of some description needs to happen. Part of building the process on that big sheet of paper we discussed earlier is to ensure but all these points where a process line crosses into a different swim lane that the communication interface is clearly understood. This might be a telephone conference call for example, but equally it could be a system input on an asset management system.

One of the challenges that we have often run into is that quality apartments are not as comfortable with swim lane process maps as they are with classical procedures. The challenge that typically emerges is to satisfy the quality teams, but the process coverage is correct without unduly burdening yourself with an additional procedure.



Fact Sheet – Process Design

Testing the process

After the process has been written printed up and placed on the large sheet of paper it is important to get many stakeholders to come on test the process to make sure that it works. At the end of this you will have like definitive process, that you then stress test at some singular location.

In choosing the location for the test choose a site that is moderately simple yet houses many of the complexities that you would want to test. Make sure you keep a test record so that you have an audit channel to both highlight when the changes have been made and make sure that you make the right changes.

Always return to core principles – is the process delivering the output desired? If quality of service is the desired outcome, is that being achieved? How is it being measured and are there incremental gains to still be had. Worth being tough on yourself at this stage as once a process is in and working, it is very much harder to change.

The final stage is to ensure that the process has company approval through your quality management system.

Changing an embedded process

It would be very easy with this topic to go off at a tangent and spend many hours talking about change management, which isn't the purpose of this document. However, it is worth considering that when we are changing a process which is already embedded, we have a degree of cultural shift in people's mindset to overcome. People will have been using this process possibly for many years and it would have been delivering in the main, so wanting to change it might seem at odds with their mindset.

Where we find ourselves changing an embedded process the most important thing is to have stakeholder buy in throughout the organisation. This is another case where the paperwork exercise with processes and post it's pinned all over the wall is a great advantage as it enables you to bring stakeholders through the room and talk them through the process and particularly the advantages of changing the process. Without getting stakeholder buy in the chances of the process change being successful will be limited.

In passenger transport most processes are in a regulated or controlled environment. Prior to changing a process, one has to consider the relevant safety implications and ensure that cross referencing of all activities that were done on the old process all captured in the new process as well. This is a documented process and needs to be able to be evidenced to the regulator at some stage.

