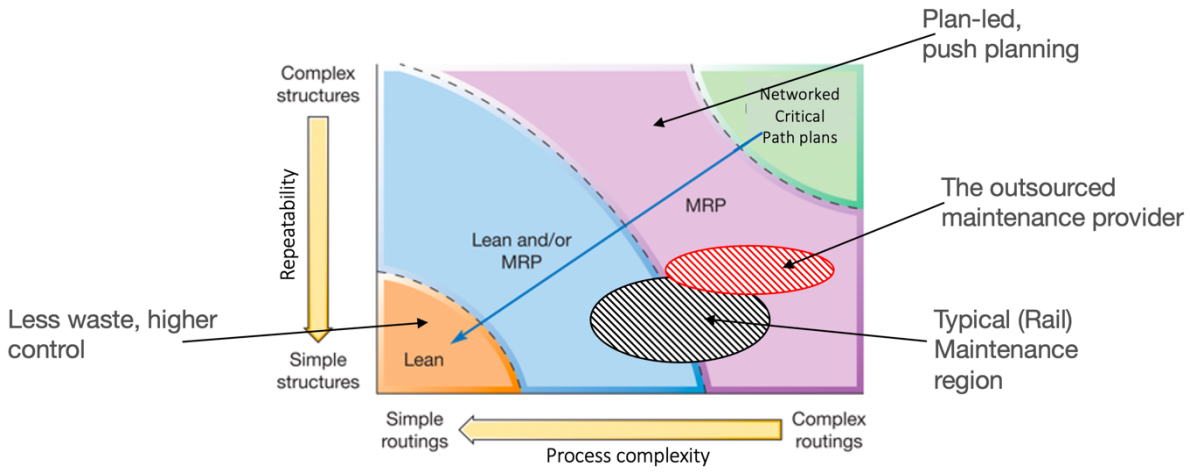
Introduction

Once jobs have been planned, availability of required materials and other resources have been assured, and coordination with internal customers has been achieved; work scheduling can begin. Scheduling (when to do the job) is the process by which all resources required for performance of specific jobs are allocated, coordinated, and synchronized at the proper time and place, with necessary access, so that work can be executed with minimal delay and completed by the agreed upon date, within estimated budget.

The schedule establishes when jobs will be done and what resources can best be applied to their performance. Schedules establish and document management's expectation for what work is to be accomplished with resources to be funded during the schedule week. Resources include manpower, materials, tools, and special equipment. Access refers to assets being prepared and accessible to be worked upon – in safe locked out state, with necessary precautions taken, permits obtained, and any specialized documentation, drawings, and other information on hand. Proper time relates to job start, duration of execution, and job completion within the time frame agreed upon with the internal customer during the weekly coordination meeting.

Planning v scheduling

Where planning stops and scheduling starts is a discussion for the organisation to have as there is no singular right answer. It depends upon the complexity of the organisation and the routings for the planning and control as can be seen in the figure below:



A very simple operation that has high repeatability is mainly scheduled by the production teams and very little planning is needed. In the main planning here is more like an extension of a sales process, establishing requirements and needs etc.

The modern railway does not operate in that area, it occupies the black and red shaded areas. Towards the left of the area less planning and more scheduling is required – typically in this area the planning team will pass over a provisional list of work covering required SMI and some key correctives at (say) the 24-hour point and leave the scheduling teams to fill in the details of other defects and the like.

Fact Sheet – Scheduling

Increasingly though we are seeing rail adopting a more centralised approach to planning, where the planning team takes on more responsibility to make sure materials, resources etc. are in the right region. The scheduling activity then is reduced and can be taken on by a shift manager for example.

It needs discussion and thought whilst planning the process, as there isn't a singular right answer.

Scheduling – the key to success

Scheduling is the hub from which all maintenance activity is executed. Upon start-up of any new maintenance management installation, scheduling is the "point function" and marketing arm of the installation; it yields the earliest tangible results evident to Operations (often within weeks). Production personnel resist change to their historical reactive culture until they experience benefit accruing to them.

In fact, the return on investment of planning and scheduling comes from the schedule and its ability to draw all the elements of the maintenance job at the right time and to the right place—allowing the job to be done with minimal downtime and maximizing the use of the maintenance resources. By contrast, preventive maintenance, job planning, and root cause failure analysis require months of focused effort before they yield measurable results. In the meantime, internal customers ask, "What are we receiving from this new system?" Program success demands that this question is not allowed to linger.

Thinking that we work best when under pressure, we subconsciously procrastinate until pressure forces us into reaction (Management by Crisis). The actuality is: although initial response may be faster, the work performed is less effective and less reliable due to lack of preparation, resulting in the need for hasty judgments. Performing the wrong things faster accomplishes nothing. The tyranny of urgency lies in its distortion of priority. Failures require instant reactive repair whereas preventive and predictive inspections, and planned backlog relief, rarely need to be performed today. However, urgency alone (without consideration of importance) cannot be allowed to dictate how vital resources are to be consumed. Excellence can be described as "performing the right things properly." One way or another, maintenance resources will perform the work to which they are assigned. The question is, "Are they to be deployed effectively through proactive scheduling, or are they to be ineffectively consumed at time of failure"? Either management schedules how it intends for vital maintenance resources to be applied or equipment failures and impatient internal customers dictate how those same resources are consumed and wasted on poorly conceived work. Prompt performance of the wrong jobs will not yield reliability!

"Either you schedule the team yourself, or you allow equipment failure and impatient customers to dictate how and when resources are consumed (and wasted)."

Schedules and Schedule Compliance are among the most important objectives of Maintenance. Managers should know specifically what they expect maintenance resources to accomplish throughout the schedule week. Supervisors need to remain abreast of progress relative to schedule expectations. The overall challenge is twofold—create a maintenance operation which is both responsive to the customer while achieving intrinsic efficient. Schedules are a device for lining up jobs waiting to be performed so that operational reliability is served and optimal utilization of maintenance labour is achieved. Four abilities are essential:

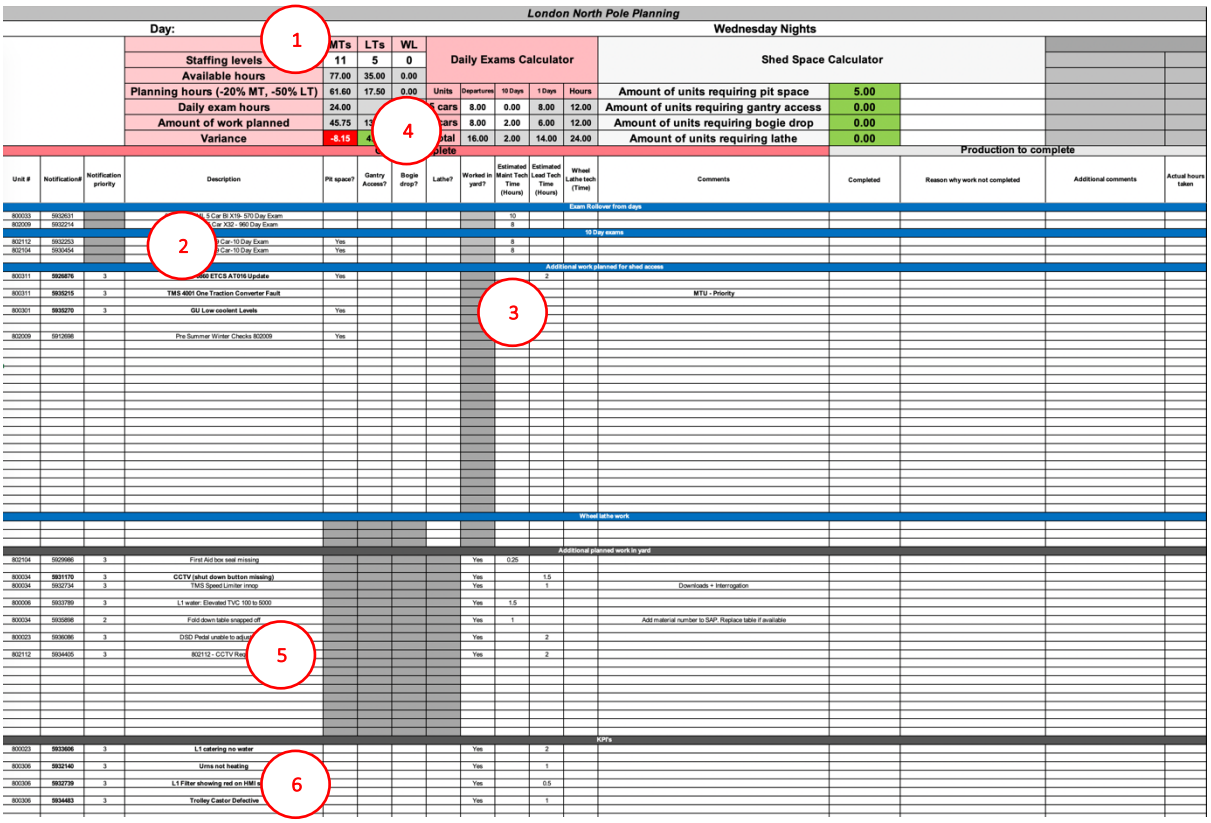
- Mutual determination of the comparative importance of various jobs ready to be scheduled.
- Schedule focus upon those jobs deemed to be most important.

- Concentrated execution of jobs in compliance with schedule.
- Perseverance Do Not Quit! Achieve the highest possible level

The list of work

(Sometimes terms the weekly or daily work schedule)

Either planning or scheduling, and in most modern maintenance environments it is a mixture of both, prepare the list of work. Key elements to include:



Example List of work

1. Available Labour Resources. The upper section lists team members by name, alpha reference code, and skill. Individuals comprising each crew are pre-posted. Should any individual have a fixed commitment to indirect activities such as training, the pre-committed capacity is posted at the appropriate time period. Scheduling of committed capacity to a job at a time when the resource is not available for direct assignment is thus avoided. Pre-commitments are easily forgotten at inopportune times.

2. Workload. The lower left section lists work orders to be completed during the schedule week, as agreed upon by Maintenance and Operations to best meet near-term service needs as well as long-term Reliability needs to assure on-going asset capacity. Jobs are listed in order of agreed upon importance stemming from the coordination meeting. The listing is, therefore, not chronological.

3. Job Schedule (Primary). This section displays timelines for loaded jobs throughout the schedule day. They are based on meaningful estimates of required duration and agreed upon access to

equipment. Technicians to whom scheduled jobs are allocated are cross referenced in the Assigned Crew column.

4. Labour Deployment. The upper right section is used to show optimal allocation of labour resources to specific scheduled jobs. Line item numbers for the scheduled jobs to which technicians are allocated are superimposed upon the appropriate time-line bars.

5. Provisional Job Load. This section is immediately below the Primary Job Load. It provides for provisional loading of ten (10%) to fifteen (15 %) percent additional work. No matter how strong schedule agreement is between Maintenance and Production, access to one or more primary jobs is frequently denied as the week enfolds. Provisional jobs are ready as substitute work orders for such occasions. They must be equally well prepared as primary jobs in order to be legitimate substitutions. If performed during the schedule week, they are credited in calculation of Schedule Compliance.

6. Contingency Job Load. This section is at the very bottom of the format beneath Provisional Job Load. It provides for contingency scheduling of jobs that participants in the coordination meeting may have deemed to be more important than some primary jobs. However, expectations were such that involved assets could not be released at any time during the scheduled week. It was agreed, however, that should a window of opportunity be presented for any of these jobs, they would be legitimate substitutions for a primary job of relatively low importance at the bottom of the primary schedule. They too must be equally well prepared as primary jobs and also receive Schedule Compliance credit if performed. When completed, the LoW documents the full expectation for work to be accomplished by Maintenance during the ensuing 24-hour period. Jobs are listed in order of importance. Necessary resources are allocated by job, day of the week, and individuals to whom allocated for assignment by the appropriate supervisor on the day each job is scheduled.