Scheduling Principles

Case Study

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The following is an extract from:

Palmer, D (1999*). Maintenance Planning and Scheduling Handbook*. McGraw-Hill

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1. Plan for the lowest skill level

Take note: The scenario *Plan for the lowest skill level*  is illustrated in video format in the virtual classroom. The video is also available in the LMS so that learners may watch it again if required. For additional detail the “story” behind the video is also documented below.

Not this way

Paula planned five tasks during the morning before tea break. Each required two tradespeople. The first task required replacement of a high pressure steam valve and needed two boilermakers for 8 hours each, an entire day. The second also required two boilermakers to construct a work bench for the maintenance shop. Paula planned for it to take 5 hours for each. The third task was a simple request to move several barrels of waste oil. He planned this task would take two fitters with a forklift and barrel attachment only 2 hours. The fourth task required replacement of a check valve. This was planned to take two fitters 5 hours. The fifth task required working on a leaking critical control valve. Paula planned this task would require two fitters for an entire day. Before taking his tea break, Paula figured that she had already planned 64 labour hours’ worth of work for the section.

Later the supervisor, Phillip began to assign work orders to various tradespeople. Phillip had two boilermakers, three fitters, an electrician, and three mechanical apprentices. There was a significant quantity of mechanic work and, as usual, more work requiring boilermakers than the section had available. Frequently, he had to second-guess the planner and use the apprentices for some of the mechanic work.

This way

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1. Priorities are important

Not this way

Mike finished his operator rounds and wrote work orders for problems he had noticed. Although most were not yet serious, Mike wanted to make sure maintenance completed them. Therefore he set a priority of 1 on the most important ones and 2 on the rest. Nearly all the work orders in the maintenance backlog had been prioritised as 1s or 2s. They were either urgent or serious. This made it difficult for the maintenance supervisor to select which work order maintenance should work on the next day. Alex assigned all twelve priority-1 work orders and three priority-2 work orders to the weekly schedule.

Early the next day, the plant manager asked that Alex immediately assign a few fitters to correct a dripping flange on the installed backup feed pump. Alex interrupted two fitters who were busy with one of the priority-2 work orders. The fitters left their current task, after first ensuring that it was left in a safe state. Then with the operations group clearing the pump and having to find suitable gasket material, they worked on replacing the flange gasket and correct the leak for the rest of the day.

This way

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1. Weekly schedule based on available hours

Not this way

As maintenance manager, George felt that maintenance could increase its productivity. Lately, he had seen more and more tradespeople heading home early. This was a problem since reliability seemed to be slipping at the plant. He knew that there was a considerable backlog of work, but the supervisors had assured him that they were assigning as much work as the tradespeople could handle. George was also concerned that supervisors had a habit of putting off tactical work orders.

George felt that advance scheduling of some sort was the answer, but the last attempt had been disastrous. Planning had first scheduled hour by hour what work maintenance should accomplish for an entire week. However, by the end of the very first day, the schedule was in shambles. Half of the scheduled work could not start at the targeted time because other work had run over its expected completion time. By the middle of the second day, the actual work-in-progress bore no resemblance to what the advance schedule had predicted. At this point, the plant had abandoned the concept and gone back to assigning work one day at a time. George felt that now was the time to implement a gate carding procedure to make sure employees worked their entire shifts.

This way

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1. Schedule for every work hour

Not This Way

Fred examined the plant's backlog of planned work and selected the work for the maintenance section for the following week. The section had forecasted 400 hours worth of total labour for all the various trade specialties. Normally Fred only scheduled for 80% of the section's forecast to allow for emergencies. This meant that sometimes he was not able to schedule all of tactical maintenance due on the equipment. This week he was able to schedule 60 hours of tactical work. At one point when allocating work out of the backlog, it became difficult to match the work orders needing attention with the remaining available electrical skills. Therefore, Fred assigned 20 hours of lesser important priority-4 work. This work required electricians and they had hours available. The resulting advance schedule was an allocation of 320 hours of planned work for the section. During the next week, the maintenance section did not experience any emergencies and completed all 320 hours of work

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This way

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1. Supervisor handles current day

Not this way

The maintenance planner sat down to create the weekly maintenance schedule. This was done by developing a series of daily schedules for a week. After the schedules were complete, the planner sent the operations group a list of sections and equipment which needed to be cleared at specified times each work day.

As the maintenance supervisor visited the various work sites during the day, he had a good idea of which work orders would finish early or late. This required constant communication with the operations group, who generally voiced displeasure about the situation. The operations group expected maintenance to be able to work on the tasks to which the planning schedule had committed them. Operators generally wasted time clearing sections and equipment when the maintenance group did not have personnel ready. He had done the operations group a favour, when he was able to put two people on a fan problem at their immediate request.

The maintenance supervisor did not think that the new scheduling system was any improvement over the previous. In the past, the maintenance supervisor had assigned each tradesperson one job at a time after he had checked with the operations group regarding clearances. The operations group could then count on maintenance personnel being ready to work on the cleared equipment.

This way

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1. Measure performance

Not this way

Three plants considered schedule compliance. It made no sense at Plant Shelton to track schedule compliance, the plant simply had too many reactive work orders. However, the sections had become very efficient in taking care of the plant. It never was a problem for maintenance to expeditiously resolve most circumstances encountered.

Plant Bains had made a commitment to track schedule compliance. The plant had assigned an analyst almost full time to the task. Rather than only give the sections credit for completed work orders, each week the analyst would also give credit for some of the work hours for work-in-progress. The analyst carefully recorded the actual work hours that tradespeople had already spent on work orders not completed and added them to the total of the planned hours for completed work. There was some concern that the calculation was mixing actual work hours for uncompleted work with planned work hours for completed work. One alternative was having the planners give an estimate of the planned hours left on each partially completed work order. Another alternative was having the supervisors give an estimate of the percentage of each work order remaining and proportioning the original planned hours. The analyst doubted there was adequate time to fine tune the calculations each week using either alternative.

Plant Calvin used the schedule compliance indicator as a hammer: the most important task for any supervisor was to finish allocated work. Management used schedule compliance scores as the major part of each supervisor's periodic evaluation. This ensured that sections accomplished all the scheduled tactical maintenance work to keep the plant reactive work to a minimum. Supervisors never failed to take charge of emergencies, but they were understandably reluctant to resolve otherwise urgent situations before they became emergencies. Management knew that this was the price to pay for concentrating on tactical work. In the long run, they felt this strategy would provide the plant with superior reliability.

This way

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