Talk to Lean specialists and, surprisingly, they'll tell you the real deal in equipment service is not planned, nor even preventive maintenance. Brian Tinham speaks with Dennis McCarthy about how transform engineering

Adding value

"Most engineers don't want to fix the same fault for the rest of their lives; they would rather use their engineering know-how to improve things." So says Dennis McCarthy, Lean consultant with DAK Consulting, who specialises in 'Lean Maintenance' – taking the ideas of 'Lean Manufacturing' to plant and equipment servicing and repair.

For McCarthy, maintenance is seen by far too many plant managers as flying in the face of Lean precepts: at best, a necessary evil, at worst, costly waste. That, he says, is because maintenance engineers and technicians are mostly tasked with minimising downtime. Hence the myopic focus on planned and/or preventive maintenance, which entails endlessly walking plants and factories, inspecting equipment, finding nothing amiss, moving on to the next, etc.

"If they're not actually doing anything to the plant, they're not adding value, and it's easy to see why they get the label they do," explains McCarthy. The problem, as he sees it, is that, while most of manufacturing has been on the 'Lean journey' for years, this whole value-adding, waste-eliminating ideology has largely passed maintenance by.

"They may have done some things with 5S [Lean's recommended 'sort, set in order, shine, standardise, sustain'] and shadow boards [forcing correct spares availability], but maintenance has not really been considered from a true Lean perspective. And the thing about Lean is that it was evolved by academics, through observation – looking at what's different about Japanese companies."

So while it's not difficult to see what makes Lean tick, introducing it is another matter. Hence, if your maintenance isn't working as well as it could, it's not immediately obvious how to introduce Lean and score the kinds of successes that manufacturing has been shouting about.

Either way, McCarthy believes that, precisely because maintenance is seen as non-value-adding, some management teams are even tempted to take Lean thinking to its ultimate and cut servicing to the bone. They get away with it for a while, but then, rather like switching off the gas on a hot air balloon, they come down to earth with a bump. And without maintenance around to see what's going wrong and why, the result is even higher costs and downtime, with plant eventually requiring major overhauls, rather than mere running repairs.

"You can only go so far in cutting maintenance costs," comments McCarthy. It's an aside, but he notes that, in the process plant world, the rule of thumb is 3% of asset value spent on maintenance, with labour roughly double material costs. That's fine, but it masks another measure – engineering quality. "Quality of maintenance can impact asset life by as much as 50%," agrees McCarthy. Risking one third of your plant life could be an expensive gamble.

But there is a better way. Changing all this is about first understanding that, for maintenance to be viewed as Lean, the emphasis needs to shift from preventing downtime to preventing defects.

How do you do that? "There are only two reasons for defects: equipment wearing out and human error," explains McCarthy. "With the first, you know the parts that wear, so you need to take steps to replace them or mitigate problems, so that machines don't become less precise in their function and impact quality. For the second, the solution is standard operating procedures, which then reduce the risk of breakdowns, in the end to zero."

Zero breakdowns

Zero breakdowns? McCarthy concedes it sounds far fetched, but explains he means major failures, not minor stops. He insists that around 1% of plants are getting there – invariably by maintaining their equipment in the right condition and by providing operator training to do so.

"In TPM [total productive maintenance], we deliberately monitor minor stops, caused, for example, by jams. Why? Because just clearing them is not enough: it's only a temporary solution, since it only deals with the symptom, not the cause. Maintenance teams doing well are those that anticipate breakdowns by watching the minor stops and understanding what they mean."

Getting to this level doesn't happen overnight. McCarthy reckons it's an 18-month journey. He cites one major plant in his experience that moved from a breakdown every four minutes to one in two hours

Dennis McCarthy, Lean consultant with DAK Consulting: root cause analysis is the key

over a three-month period. “If you never strive for it, you never get it,” he quips.

Part of that is about changing the KPIs that matter: for example, moving from measuring the time between unplanned stops to the time between interventions to avoid defects. They are radically different, and this change drives managers’, engineers’ and technicians’ behaviour. Improving this measure is about looking for, and using, early problem indicators beyond minor breakdowns.

The point is that, with the indicators known and acted upon, and the plant running with fewer breakdowns and closer to design specification, the role for maintenance engineers changes – to also extending the time between interventions, but also improving plant operations, capacity, consistency etc. Then Lean maintenance is finally seen as value adding and you’re into the virtuous circle.

In short, if equipment is no longer seriously breaking down, then maintenance has more time to work on process improvement projects. So it gets better at understanding the machines, processes, and cause and effect. Then the processes get even better, with more uptime and better quality. Maintenance engineers and the project work they do is valued even more highly. And so on.

Sadly, all too often, maintenance teams don’t get there. At some point, management refocuses on ‘improving efficiency’ and misguidedly embarks on cost cutting again. Such initiatives can make sense for a while – nothing is beyond improvement. However, as McCarthy says, they break the ‘Lean Maintenance’ cycle and it’s not long until you’re back with the old ways. PE

It’s good to talk

The importance of communication cannot be exaggerated – and maintenance is no exception. As Dave Manning-Ohren, service team leader with MRO specialist Eriks, says, if maintenance doesn’t talk to the service provider about why equipment has been pulled, then they’re missing an opportunity to prevent the problem from arising again.

“People don’t look at failure modes and communicate those to the repair shop,” he explains. “So maintenance might receive an electric motor for repair, and they could overhaul it, check the balance and send it back – when the issue might have been the drive end bearing. And that might be wearing, because of contaminated grease or poor alignment.”

Manning-Ohren urges engineering teams to remember that linking condition monitoring to repair, and vice versa, can pay serious dividends. “Rather than simply providing instructions, such as ‘repair as required’ or ‘change bearings’, take the time to indicate root cause. If it turns out to be contaminated grease, for example, there might be opportunities to improve the sealing. They might be spending tens of thousands of pounds pulling the equipment. It’s got to be worth passing on information about the problem.”