Summary - What is it?

TPM is focused on increasing the dependability and robustness of asset (machine) performance through problem solving and the involvement of front line and support staff. At its core is the metric known as Overall Equipment Effectiveness or oee. This is used to assess the performance of machines in terms of their Availability, Speed and Quality, and to prioritise areas for improvement. (see the separate Briefing on the oee Measure in the Library)

Because of the emphasis that TPM places on asset performance, it has often been introduced to support companies as they progress towards Just in Time (JIT) manufacture, and as such is a key ingredient of the Lean Manufacturing approach.

Many of the root causes of poor asset performance are often found in support or administrative processes, so any TPM programme needs to ‘cut across’ these areas of the organisation, though its focus is always on the performance of front line assets, and the teams that operate them.

Key Tools:

There are six pillars to TPM:

• The oee measure

• Autonomous maintenance

• Continuous improvement

• Staff Training

• Planned and predictive maintenance

• Early equipment management

And as measured by oee, TPM programmes focus heavily on the six major performance losses:

- Changeover losses
- Breakdown losses
- Minor stoppages
- Speed losses
- Start up losses
- Quality and rework losses

(For a more detailed account of the losses see Money & Machines on the home page)

History:

TPM was originally developed in Japan during the 1960’s, and the Institute of Plant Maintenance is credited with defining the principles of TPM and is now involved in promoting them.

An annual TPM prize is awarded by the Institute, and past winners have included Unilever (numerous sites), Fujii, Volvo Cars (Europe), Pirelli and Sony Chemicals. The original translation of the acronym ‘TPM’ was Total Productive Maintenance. Unfortunately, this has led to a good deal of confusion in the West as to exactly which department within a company leads TPM initiatives.

The original translation suggested that it was a maintenance function activity - but this is NOT the case. For the Japanese the term ‘maintenance’ was used in a much more general organisation-wide way, in much the same way as the term ‘quality’. TPM is in fact operator-centric, in that it places the operational or production staff very much at the centre of asset improvement. This reflects the fundamental belief of its originators that assets are ‘owned’ by the employees who operate them. Operator initiated activities will always involve experts, such as maintenance, engineering or equipment suppliers, but TPM aims to eradicate the ‘I operate, you fix’ mentality that is present in many manufacturers, where there are low levels of equipment ownership.
Success Stories:

Kodak reported that a $5 million investment resulted in a $16 million increase in profits, which was directly linked to the implementation of a TPM programme.

Texas Instruments reported increased production figures of up to 80% in some areas through the application of TPM.

Ford, Eastman Kodak, Dana Corp., Allen Bradley, Harley Davidson all claim to have implemented TPM successfully, and have reported significant productivity gains as a result.

Critique:

TPM shares many of the characteristics of some of the other initiatives described elsewhere in the ‘5 Minute Experts’, such as Six Sigma.

Fundamentally, it requires total company involvement; it is a long-term project and focuses on both ‘hard’ measurable improvements, and ‘soft’ behavioural and attitudinal changes amongst staff. For these very reasons, it should never be seen as a ‘quick fix’ solution to problems - unfortunately, the circumstances of implementation often mean there is considerable pressure for it to be so.

Another key problem with the implementation of TPM is the poor understanding and application of the oee measure, which should become the bedrock from which all improvements are measured. If this fundamental building block is not in place, the cost/benefit of implementing the other TPM pillars will not be clear, and will lack credibility.

On its own, TPM could be considered a rather one dimensional approach to improving company performance. The oee measure certainly does not capture all aspects of manufacturing performance, and the TPM pillars do not in themselves challenge the business to identify customer critical processes, nor prioritise these. But it can provide significant cost benefit, as well as improved process dependability, which in turn allows companies to pursue optimal manufacturing strategies, such as JIT or mass customisation.

*oee’s approach...*

The oee measure is central to the formulation and execution of a TPM improvement strategy. Initial benchmarking of machine oee performance often reveals a potential for improvement that is far greater than existing measures such as ‘uptime’ normally show.

It is not untypical to find companies running their assets in the region of 20-30% while thinking they are working them ‘hard’. Using the oee measure to make performance transparent is therefore a key part of our approach, and this involves considerable training of front line staff to ensure that measurement of oee is robust.

In some instances gaining a rapid insight into the potential opportunity (size of the oee gap) can be achieved by automating the collection of data. In company’s with large scale, complex capital plant, this can provide a powerful stimulus to introducing a pilot, and subsequently company wide, TPM programme.

It is not effective to try and implement all the TPM pillars and tools and techniques simultaneously - it will be expensive and will lack focus. The correct use of the measure will reveal which technique, from autonomous maintenance to set-up reduction (SMED) or Condition Based Monitoring, is required.

Oee have extensive experience helping clients to implement TPM programmes. We have a wide range of TPM training modules to support this process in areas such as Team Based Problems solving, autonomous maintenance, 5s, bottleneck analysis and simulation. Oee also have in-depth experience in helping clients generate a culture which supports a TPM approach.

The success of TPM is subject to the same key enablers that most improvement programmes rely upon. Oee helps our clients to address these at the outset:

- High level of management support for the process
- Clear business imperative for the programme
• Clear understanding of the size of the opportunity (e.g. the Cost of Non Conformance)
• Clear understanding of the cost of the programme
• Effective change management process

After putting in place these enablers, we help our clients pilot the programme and learn from this, before broadening it out across the business. We also help to educate and train the client as well support the implementation we’ll support the implementation.

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