

similar of the definition for Ai, except that preventive (i.e. scheduled) maintenance is included. It excludes logistic delay time and administrative delay time.

Operational Availability

Operational availability is the “probability that a system or equipment, when used under stated conditions in an actual operational environment, will operate satisfactorily when called upon.

9.7 TOTAL PRODUCTIVE MAINTENANCE (TPM)

- Total productive maintenance (TPM) originated in Japan in 1971 as a method for improved machine availability through better utilization of maintenance and production resources. It is an extension of the Total Quality Management (TQM) philosophy to the maintenance function
- It can be considered as the medical science of machines.
- **Total Productive Maintenance (TPM) is a maintenance program which involves a newly defined concept for maintaining plants and equipment.**
- The goal of the TPM program is to markedly increase production while, at the same time, increasing employee morale and job satisfaction.
- TPM brings maintenance into focus as a necessary and vitally important part of the business.
- **It is no longer regarded as a non-profit activity. Down time for maintenance is scheduled as a part of the manufacturing day and, in some cases, as an integral part of the manufacturing process.**
- **The goal is to hold emergency and unscheduled maintenance to a minimum**

Objectives of TPM

The main objectives of TPM are:

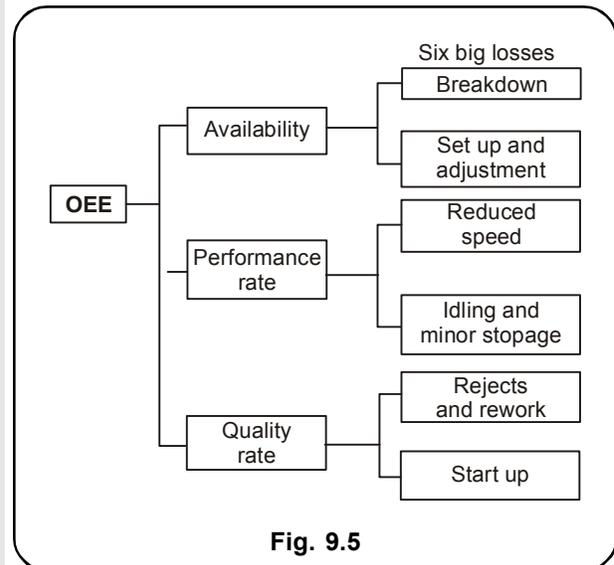
- TPM aims to maximize overall equipment effectiveness (OEE).
- TPM establishes a thorough system of planned maintenance (PM) for the equipment’s entire lifespan.
- TPM should be implemented by cross-functional teams from various departments.
- TPM involves every single employee from the top management to workers on the shop floor.
- TPM is based on the promotion of planned maintenance through autonomous small group activities.

Overall Equipment Effectiveness (OEE)

TPM strives to achieve OEE by maximizing output while minimizing input. The input consists of labour, machine and materials while the output consists of production (P), quality (Q), cost (c), delivery (D), safety, health and environment (S) and morale (M). TPM strives to maximize output (PQCDSM) by maintaining ideal operating conditions and running equipment effectively. To achieve OEE, TPM concentrates on eliminating “six big losses:’

Six Big losses

The six big losses can be grouped under three main heads-availability (downtime), performance rate (speed losses) and quality rate (defects).



The Eight TPM Pillar

Once a high degree of stability is established using the 5S program, an organization can start implementing the total productive maintenance in earnest.

Total productive maintenance has eight pillars that are aimed at proactively establishing reliability of machines. One point that has to be made here is that people are centre of this system and must be continuously trained to identify and eliminate waste. It is a system that is based on a clear set of principles and structures and should not be interpreted to be a set of tools or techniques to be applied haphazardly.