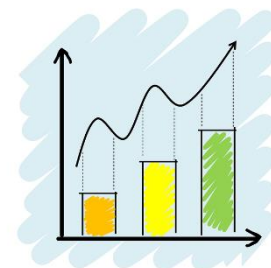# TOTAL PRODUCTIVE MAINTENANCE IN MANUFACTURING INDUSTRIES

Total productive maintenance or TPM is a way to achieve maximal equipment effectiveness through employee involvement from operators and maintenance professionals to everyone from senior management. Total productive maintenance is a system of maintaining and improving the integrity of production and quality systems through the machines/equipments, processes and employees that add business value to an organization. The main focus of TPM is on keeping machines running in their best condition to avoid costly repairs and downtime. TPM goes hand-in-hand with Total Quality Management (TQM) and it requires commitment from everyone in the business.
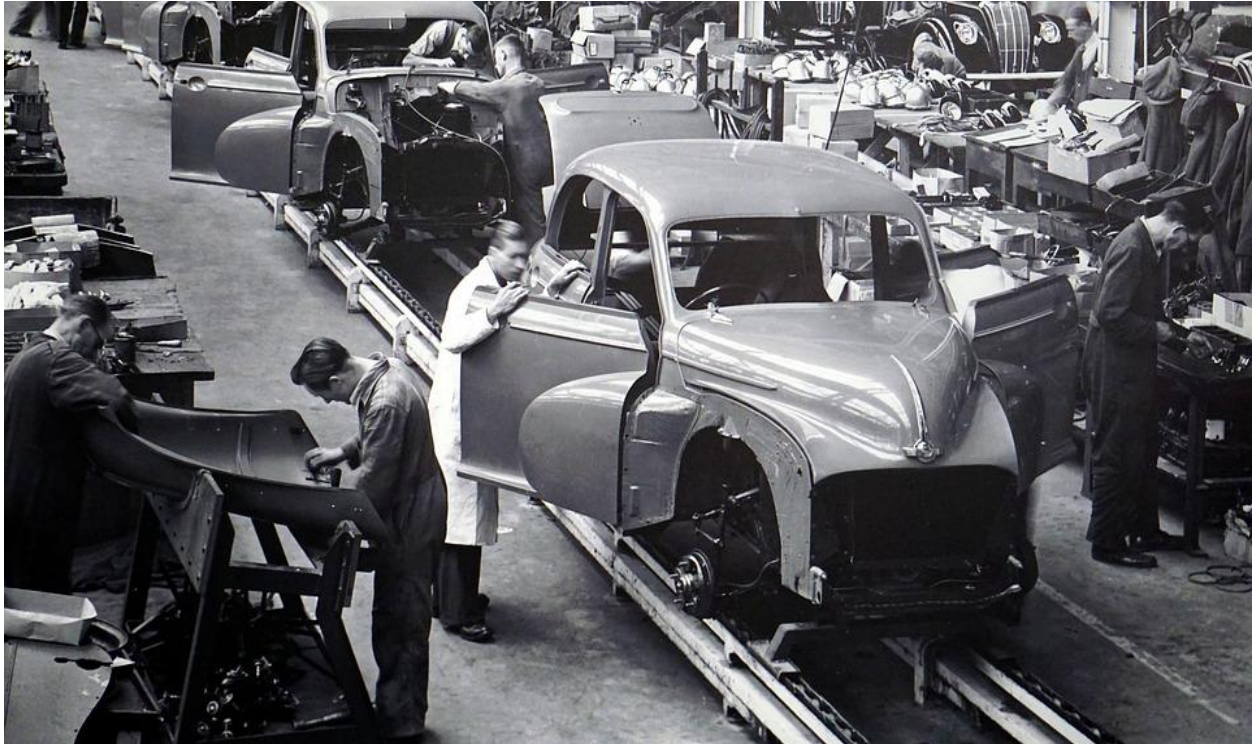


TPM aims to increase overall equipment effectiveness (OEE) and is comprised of three main parts:

## OEE = Performance * Availability * Quality

In reality, OEE **85% to 90%** is what companies strive for and it is not easy to achieve it. Only some good companies are able to achieve this mark.

How TPM approach is helping manufacturing industries in achieving maximum productivity, can be best explained with the help of the given case study:

Let say a business is going well but on a closer look the workers don't want to be bothered with routine maintenance and when machines aren't maintained or when they're so dirty that one can't even read the gauges, at that time things go wrong and if the company's approach is to wait until something breaks do a quick repair and then go right back into operation, eventually, later on, one will face bigger problems like long amounts of downtime throughout the company just to replace one small part. That's where total productive maintenance or TPM comes in picture.
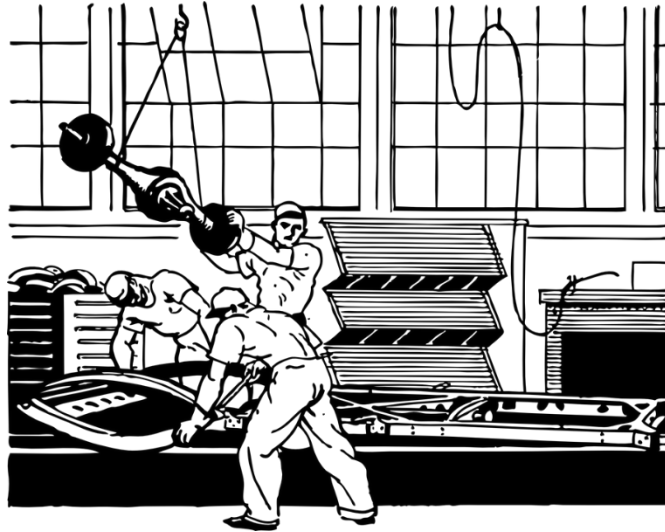
TPM is the lean approach to improving the manufacturing process combining the traditional practice of preventive maintenance with total quality control and total employee involvement. TPM is not just an improvement program for maintenance staff only or a program to only cosmetically improve machines, it is an organization-wide equipment improvement strategy which focuses on eliminating the major equipment related losses .There are many approaches to TPM to ensure a practical sustainable approach. It all begins with the seven steps given below:

a.  Knowing your equipment's history instead of finding out how your equipment works only when it fails
b.  Building a database for each piece of equipment based on supplier recommendations
c.  Knowing the operating conditions and avoiding any guesswork
d.  Providing specific skills and knowledge to employees to know exactly what and when to maintain and how long it will take if a part fails
e.  Once the database is built the processes have to be standardized validating the key parameters
f.  Set  points for each product and then detailed training begins on how to measure the processes, identify losses and put in place solutions that will improve the process
g.  Begin planned  maintenance where routine maintenance is scheduled with actions maintaining each part of the machine at recommended intervals to improve machine performance

Keeping the equipment clean is part of the procedure each team member is responsible for a clean safe work environment. Regular cleaning can detect fall at an early stage avoiding sudden breakdowns or bigger problems in the future. Spare parts are analyzed based on consumption and past purchases. The spare parts that wear out often are always accessible and once the system is set up, take a pit-stop approach to trial standard operating procedure tasks. Analyze what is and what isn't working and key process indicators are monitored and managed to continuously improve the process.

So with TPM, breakdowns and machine speed and quality problems are reduced and when things do go wrong, time is not wasted in finding the missing parts or workers sitting idle. It is an efficient system in place where everyone owns his role in the implementation. These seven steps along with a continuous improvement process will help you achieve total productive maintenance.

**About Arrelic**

Arrelic is a fast-growing deep-tech firm aiming to bring the next level of IoT based sensor technology to transform the mode of manufacturing operation and maintenance practice of various industries with extensive expertise in Reliability Engineering, Predictive Maintenance, Industrial Internet of Things (IIoT) Sensors, Machine Learning and Artificial Intelligence. We provide a single ecosystem for catering all industry needs from Consulting to IoT and Analytics as well as providing Training and Development courses for different stakeholders. We aim to help manufacturing industries to improve their overall plant productivity, reliability and minimize total production cost by 25-30% by eliminating machine downtime, lightening management decisions by analysing the machine data with right mind and expertise; for a worry free operation.

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