



A Review of the Total Productive Maintenance (TPM) Strategies for Improving Maintenance Programmes at Nuclear Power Plants

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Abstract

The eight pillars of Total Productive Maintenance (TPM) strategies were reviewed with a view to making suggestions to nuclear power plant organisations to adopt the strategies and integrate them into their maintenance programme in order to improve the maintenance programme, leading to improved equipment effectiveness and safety.

Introduction

- Effective maintenance programme implementation is vital for the safe operation of nuclear power plants [1].
- Traditionally, TPM strategies have been implemented in manufacturing industries to improve equipment effectiveness.
- But TPM has also been successfully implemented in traditional thermal power plants [2] and [3].
- Nuclear power plants can equally benefit from TPM strategies since they and traditional thermal power plants have some systems, structures, and components in common, such as turbines and generators.

The Eight Pillars of TPM

As described by [4], these are: (1) **Autonomous Maintenance**: that is, giving operators ownership of equipment and empowering them to carry out basic maintenance tasks, such as tightening loosened bolts, without always relying on the main maintenance staff. (2) **Focused Improvement**: that is, prioritising the implementation of a large number of small improvements as against a small number of big improvements (3) **Planned Maintenance**: that is, scheduling equipment maintenance tasks based on the recorded history of equipment failure rates. (4) **Early Equipment Maintenance**: that is, designing new equipment with consideration of lessons learned from a previous TPM on the same equipment. E.g., ease of cleaning consideration. (5) **Quality Maintenance**: that is, ensuring the equipment is of the right quality before installation. (6) **Education and Training**: that is, thoroughly educating and training the operators and maintenance staff in their jobs. (7) **Safety, Health, and the Environment**: that is, providing standard operating procedures and ensuring that the environment is safe, devoid of dangers, accidents, or injuries. (8) **Office TPM**: that is, integrating and entrenching TPM principles in workplace administration and processes. E.g., timely procuring spare parts during repairs and preventing communication breakdown

Measuring the Success of the TPM Strategy Implementation

- Organisations can evaluate the effectiveness of their equipment before and after TPM implementation and compare the results.
- For example, in a previous study in a thermal power plant [3], turbine and alternator efficiencies were evaluated before and after TPM implementation. It was found that after TPM implementation, turbine efficiency and alternator power output increased.

Conclusion

To enhance safety, nuclear power plant organisations have to continuously improve their maintenance programmes. In this regard, TPM provides proven strategies that can improve equipment effectiveness and safety at nuclear power plants.

References

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