

Total productive maintenance



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The case study of total productive maintenance implementation focused on its implementation, in three different companies. The paper focused on the study of total productive maintenance focused on the reasons that made the three companies implement the total productive maintenance implementation and how they did it. This paper analyses the implementation of the total productive maintenance implementation in the three countries.

Discussion: A Summary of the case study

These three companies implemented the total production maintenance because of the problems they had. This means that they used the total productive maintenance as a mitigation measure for the problems that they had. They implemented the total productive maintenance, to either solve or reduce the impact of the problem that faced them. In the implementation of the total productive maintenance, the management of the three companies supported the total productive maintenance implementation. This made them set up proper mechanisms and organizational structures that made the implementation possible. All the three companies applied the seven steps of autonomous maintenance from Nakajima. Despite the fact that the three companies applied different pillars of total productive maintenance, they had some, in common. These included education and training, safety, quality maintenance and improvements. The difference that resulted from the implementation of total productive maintenance came from the use of ABC classification systems and the responsibilities and the roles that the facilitators engaged, in the implementation process (Wireman, 2004).

This case study provided a guidance to show how the process of implementing total productive maintenance would help solve problems that came up, in different situations and circumstances. This could happen, in relation to specific strategic objectives of the respective company. The data provided enables practitioners to understand the significance of a relevant infrastructure and the role played by coordinators throughout the implementation process. This includes the type of training required for different levels of organizational hierarchy. In other words, the implementation of total productive maintenance called for specialized education and training, especially relating to the different levels of the implementation exercise, in a company.

The total productive maintenance strategy came into existence based on a planned approach to preventive maintenance, in Japan. Nakajima demonstrated how twenty Japanese companies that existed in 1953 formed a preventive maintenance research group. After a mission that went to the United States of America, to study equipment maintenance, in 1952 the Japan institute of plant engineers came into existence in 1969. This acted as the predecessor to the Japan institute of plant maintenance. In 1969, the Japan institute of plant engineers worked closely with the automotive component manufacturer called Nippondenso regarding the issue of preventive maintenance. When the company made a decision to change the role of operators, to allow them carries out routine maintenance, total productive maintenance came into existence (Willmott & McCarthy, 2001).

Therefore, total productive management originated in Japan, in 1969.

However, the introduction of total production maintenance did not get a

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popular reception. Few companies decided to take up the strategy and implement it. The severe and disturbing economic difficulties, in the early 1970s accelerated the adaptation of total productive maintenance. This happened with the support from the program that Tokai Rubber Industries introduced. The program had seven steps for its implementation.

During the early 1990s, organizations from the west showed interest in total productive maintenance. They adopted this strategy from their total quality management interventions. However, little empirical study and analysis exists concerning this matter. Most academic papers do not focus on the empirical study and analysis of this subject. Instead, they focus on the relationship that exists, in the implementation of total productive maintenance strategy and other productivity initiatives. This case study presented information that touched on the implementation of total productivity maintenance, in the three companies, the processes used, the roles played by total productive maintenance coordinators, and the goals of the individual companies towards the implementation of total productive maintenance.

Key elements of the case study

One can understand the key elements of the study by looking at the individual companies and the ways the three companies applied total productive maintenance strategy, to their operations and functions.

The first company involves a United Kingdom plant that started in 1968, to increase its production of a range of rubber products. The company has an estimated number of employees rating at thirty eight thousand. It achieves

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to get sales of five billion Euros that covered a variety of products. The economic recession that hit the world, during the early 1990s affected the markets for rubber markets. Therefore, the company had to engage in certain measures that would help it achieve success. To do that, the company realized that it had to set up its services and operations to become of a world class status. The company involved itself in a market research that highlighted the constant growth rate of a high performance product segment and the need for modern products that have progressive short life cycles, more quality for original equipment and replacements and attention to environmental matters. At the time of the analysis, a gap existed between the targets of the company and its activities (Leflar, 2001).

The company also had difficulty that involved inadequacy of skilled labor, low employee participation and lack of appropriate improvement mechanisms that could run the company continuously. Therefore, this shows that the company faced a serious problem and had to look for a mechanism that would help it solve the problem it faced. To do that, the company had to implement total productive maintenance. The implementation of total productive maintenance started in the early 1990s, when the company decided to launch the seven pillars of total productive maintenance, which included individual improvements, autonomous maintenance, TPM in offices, education and training, early equipment management, safety and quality maintenance. Two years after this, the company got an award for Japanese institute of preventive maintenance award (Ireland & Dale, 2001).

The company engaged in TPM process, which involved setting up a steering committee, with the site director as the chairperson and maintenance,

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human resources, production and continuous improvement managers as members together with trade union representation. The implementation of the total productive implementation had certain aims. The company aimed at achieving no losses coming from accidents defects, or any failures. It aimed at creating a corporate system that would maximize efficiency of the process. It would involve all sectors that include production, development and administration. It would also involve all employees from senior management to operators and clerical staff. The last aim that the company would achieve involved developing small group that would contribute towards the betterment of the society (Bird, 2001).

The company broke down the costs that would function for the aims that the company had planned. The analysis of the cost would help the company carry out improvements, to benefit the company. In so doing, the company analyzed the losses that it had incurred. These would help because they would act as overall equipment effectiveness measure to set targets for reduction of the losses. This highlighted and indentified a value added, semi-value and non-value added operations. The company minimized semi-added values and eliminated non-valued operations.

The total productive maintenance process enabled the company explore changes to organizational culture and competencies. The company applied all the seven steps of autonomous maintenance, with the first two taking effect within the first two years of implementation. The company followed the seven steps of autonomous, in a systematic manner over the period of implementation (Roberts, 2011).

For the company to make improvement activities a priority, it adopted the ABC classification system. Out of three hundred and twenty nine machines, the company carried out total productive maintenance on the top ten machines only. The exercise had instituted a detailed breakdown analyses and corrective measures. The next exercise involved the program meant to restore machines, which emphasized on putting in place measures that would counter and make it easy for operators, to clean, inspect, optimize output and ensure quality. The implementation of autonomous maintenance enabled a gradual change from breakdown maintenance to planned, predictive maintenance and preventive maintenance. It also caused consequential changes, to the organization and operation of the function of maintenance.

All the managers, in the company received training that would help them to fit and participate in the implementation of total productive maintenance. The knowledge they got from the training helped them support the process of implementing total productive maintenance. The management support came from the top most managers to the junior managers, who worked in the company shops. The implementation of the total productive maintenance made the company remove its suggestions because the managers considered it as a hindrance towards the progress of total productive maintenance. The company had set certain objectives that it would meet by implementing the total productive maintenance strategy. It had an objective to standardize organizational models and output all over the world. It would increase autonomy and empower all organizational levels. This would enable the success of the company starting from the lowest level to the highest

level, in the company. It would introduce effective and efficient teamwork. This meant that the company would use the strengths of all members of the company irrespective of the position they occupied, in the company. The company had an objective to increase flexibility and react to customer needs on a timely basis. Lastly, the company would ensure that it offers a quality competitiveness that aimed at achieving high performance and reduce the costs required, in the process of implementation (Bird, 2001).

TPM implementation

Company B had its own way of implementing total productive maintenance. The company specializes in packaging. It has a global network that involves thirty countries, in America, Africa, Europe, and Asia. It has employed over thirty thousand workers in one hundred and sixty factories that it has. In 1990, the company faced a threat of closing down. Therefore, it had to find mitigation measures that could help it move against the threat of closure. In 1991, the company decided to implement total quality maintenance. This worked to ensure that the company did not close. However, total quality maintenance did not help it improve its services that would ensure that the company gets the intended profits. Therefore, the company decided to implement total productive maintenance, in 1994. Total productive maintenance efforts focused on an analysis done on the company. With the implementation of total productive maintenance, sixteen projects had become successful by the year 1996. The management of the company decided to accelerate the speed of improvements in the company. With this, it decided to aim for the Japan institute of plant maintenance, by the year

1998. This made the company realize total productive maintenance excellence first category by 1998 (Willmott & McCarthy, 2001).

Just like company A did, company B applied the seven pillars of total productive maintenance, in its implementation process. Each pillar comprised of seven steps that the company applied systematically. These brought positive results documented in the profile of the company. Workforce involved, in the company increased from ten to eighty five percent. The complains brought by customers reduced up to twenty percent, production increased by forty percent, overtime costs and absenteeism reduced by forty percent each. Each worker contributed to the success of the company by forty six percent.

The company implemented the total productive maintenance strategy using a specified process. It established an organizational structure referred to as world-class performance promotion. This divided the factory, in three modules. Each of the modules had a module leader. Unlike company A, it did not have specific total productive maintenance facilitators and coordinators. Instead of facilitators and coordinators, the company used an overall world-class performance manager, who worked together with the module leaders and their teams (Gopalakrishnan, 2003).

The company carried out an analysis on costs and volume deployment techniques. This meant to identify areas that needed improvements and the techniques that the areas required. The company also used the seven steps of autonomous maintenance, which gave rise to planned maintenance. The

company used quality maintenance, to remove defects by setting and controlling equipment conditions.

The company engaged in that process by ascertaining the relationship that the product characteristics shared with the production process. The company restored machine conditions by determining optimum operating conditions that would remove defect products. The company used the early equipment approach by Nakajima as a process for purchasing or developing new products. The company developed a new product by using that product and process manufacturing experience.

The company laid down certain objectives for the implementation of total productive maintenance. It had to create a safe working surrounding, comply with legal guidelines and reduce costs, through the reduction of accidents. The strategic objectives that the company set meant to set targets for improvements. The company had to increase the percentage of workforce involvement, reduce customer complaints, increase the quantity of production, reduce overtime costs and absenteeism, and increase individual employee output. For these to happen, the company had to expand breakdown successes, to the rest of the departments, continue its support, to autonomous maintenance, expand the development of computerized systems, continue with stock reduction and expand the maintenance of zone systems, to other machines. It also had to communicate with suppliers for other systems, continue developing systems for budget control and review maintenance costs (Ireland & Dale, 2001).

TPM implementation

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Company C also used total productive maintenance for the improvement of its operations and services. The company manufactures motor vehicles. During the mid 1980s, the company received sixty percent share from a Japanese firm. Towards the 1990, the shares from the Japanese company had increased to ninety nine percent. The Japanese company came with the total productive maintenance process and stability for the manufacturing firm and guaranteed the people who worked there permanent jobs for a period of three years. Towards 1990, the company applied three pillars of total productive maintenance strategy, which included OEE and motivation. The reason for using the three pillars involved the fact that the company aimed at reducing losses, in quality, cost and delivery. In the period between 1992 and 1994, the company came up with a total productive approach that covered offices, autonomous and planned maintenance. In 1994, the company got a Japanese institute of plant maintenance award. Using the seven pillars of total productive maintenance, the company aimed at achieving level two of Japanese institute of plant maintenance, by the year 2001.

The company involved itself in a process that would help it in the implementation of total productive maintenance. The company chose a team that comprised of twelve facilitators and coordinators, who reported directly to the president of the factory. The team used cost deployment to identify the areas that needed improvement. The focus of implementing total productive maintenance involved increasing productivity, reducing workspace and increasing the market share (Kunio & Et. al, 2004).

This improved the productivity rate in the company. For instance, the company used thirty-five days to manufacture a motorcycle, in 1989. However, it takes only seven days to manufacture the same motorcycle, currently. The company focused on achieving optimum line balancing and one-piece flow operations. Just like company A and B, the company utilizes the seven steps of autonomous maintenance, brought forth by Nakajima. Company C focused on its employee base and their training. The company spent a considerable amount of money to train its employees. The company focused on training because it realized that high operator skills meant no setters or inspectors would exist. It would reduce the number of maintenance staff and this would encourage teamwork. The company also focused on flattening its organizational structure. Currently, it has four layers, which include operators, team leaders, factory director and improvement assistants and engineers (Roberts, 2011).

The company aimed at winning level two of the Japanese institute of plant maintenance by the year 2001. this meant that the company had to improve all sectors and increase its market share for all the products it took to the market.

General analysis

The study of the three companies that operate globally helps one understand the operations of total productive maintenance. First, the implementation of the total productive maintenance requires that firms or organizations come up with relevant strategies that stem up from the problems facing the respective organizations. The study of the three companies brings forth a

resemblance concerning the problems that international firms face. These problems involve economic failures, production problems, employee problems, training and cost problems. Therefore, total productive maintenance provides a ground that helps companies deal with the problems that they face. Companies must formulate aims and objectives that should guide the process of implementing total productive maintenance strategies. The seven pillars of total productive maintenance and seven steps of autonomous maintenance provide ways that could help companies solve the problems that they face. Companies must involve people in the implementation process, to work as a team for the realization of the aims and objectives set by the companies (Leflar, 2001).

Organizations must follow the right process, when implementing total productive maintenance strategies must always exist for organizations to meet their objectives. This means that they should apply the seven pillars of TPM and the seven steps of autonomous maintenance, in a systematic and hierarchical manner that would help in ensuring that each component works the way it should.

Actions for improving outcomes

If a chance would come for me to act as a decision maker in this case, I would take an inclusive and teamwork perspectives. Teamwork perspective means that all people working in the company would have a contribution, to make. I would ensure that I set up TPM organizational structures that would ensure that each person has a role to play, in the implementation of the TPM. This means that I would enable all the employees, in the company become

aware of the importance of their contribution towards the improvement of the company. The inclusive perspective means combining teamwork together with TPM for an improved productivity. Each pillar and step would ensure that the company moves to greater heights of production. The combination of TPM, JIPM, autonomous maintenance and qualitative maintenance would matter, in all processes and functions of the company.

Total productive maintenance has proved the capacity for helping companies set up their operations through outlining feasible aims and objectives, structures and guidelines. These improve the production of companies, increase their market share and help them achieve high performance using minimum costs. Companies that have used TPM have realized immense performance growth levels.