

The Influence of Organizational Culture on Total Productive Maintenance (TPM) Practices in Manufacturing Companies

Mahefud Ismail, Nurulita Aulia Sari, Dery Permana Maha Putra, Erry Rimawan
Master of Industrial Engineering Mercubuana University, Menteng

Abstract:- This study discusses how the influence of organizational culture through 8 pillar TPM in improving the practice and application of Total Productive Maintenance (TPM) in manufacturing companies. Total Productive Maintenance (TPM) is a system or culture that takes the capabilities and skills of each individual in an organization to perform maintain and maintenance on production equipment, this is an important strategy for manufacturing organizations in increasing their productivity. Analysis of literature studies conducted on expert opinions and previous journals, the study found that organizational culture affects all pillars of Total Productive Maintenance (TPM). The concept of Total Productive Maintenance (TPM) is a combination between the development of organizational culture and measurement practices, where an employee or production operator must have a good organizational culture so as to develop the practice of Sorting Out, Arranging efficiently, Checking through Cleaning, Neatness and Discipline.

Keywords:- Total Productive maintenance, Organizational Culture, maintenance.

I. INTRODUCTION

Total Productive Maintenance (TPM) is an integrated maintenance system developed from preventive maintenance and corrective maintenance systems and involves the participation of all parties, especially operators as tool users in performing maintenance of production machinery (Borris, 2016). Borris (2016) Total Productive Maintenance (TPM) is influenced by various factors such as standardization, organizational culture, maintenance practices to production management. Organizational culture is an important factor in the practice of Total Productive Maintenance (TPM). The Lycke (2013) study explains that Total Productive Maintenance (TPM) is influenced by management initiatives in delivering sustainable organizational maintenance and vision policies. Total Productive Maintenance (TPM) aims to maximize equipment effectiveness (overall effectiveness) and establish a comprehensive maintenance for corporate resilience (Borris, 2016).

Total Productive Maintenance (TPM) is implemented by various departments (organization management, engineering, production, and maintenance) by involving every employee from Top Management to factory floor worker. Research Shah (2012) explains that maintenance in Total Productive Maintenance (TPM) through 'motivating

management' is small group activities that are done alone. Organizational culture can improve the practice of Total Productive Maintenance (TPM) implementation in the manufacturing process of a manufacturing machine, a good organizational culture creates high performance in operators and management to commit to developing Total Productive Maintenance (TPM) efficiently and effectively (Lycke, 2013).

Seiichi Nakajima in Borris (2016) defines Total Productive Maintenance (TPM) as an innovative approach in maintenance by optimizing equipment effectiveness, reducing / eliminating breakdowns and performing autonomous operator maintenance. Total Productive Maintenance (TPM) practices require good operational quality management with a supportive organizational culture, considering that TPM should be continuous and periodic and with special treatment in accordance with the specifications of the equipment. Research Pradhani & Senapati (2014) explains that Total Productive Maintenance (TPM) in manufacturing companies is done by awareness of operators and production employees, and management ability to minimize risk. Furthermore, Pradhani & Senapati (2014) found that 84% of machine and production operators in manufacturing companies perform Total Productive Maintenance (TPM) steps on production machines to prevent risks. Pradhani & Senapati (2014) explains that employees' awareness to always provide optimal performance is shaped by organizational culture.

Total Productive Maintenance (TPM) is needed to overcome Six Big Losses in the company's production process, this practice seeks to ensure that production equipment has optimum durability (Render & Heizer, 2011). Total Productive Maintenance (TPM) is performed to restore the condition of the production equipment to the optimal state for use in the production process, necessary to increase the operator's involvement in the maintenance of the production equipment. Render & Heizer (2011) explains that managerial policies and managerial factors affect operator performance in maintenance of production equipment in manufacturing companies. The development of Total Productive Maintenance (TPM) requires commitment from top management to develop training and improvement of operational skills of operators and production employees. Capacity building of employees and operators is a commitment in a good organizational culture (Render & Heizer, 2011). Total Productive Maintenance (TPM) aims to gain substantial profit by using a close correlation between product quality and predictive productive machine maintenance involving all sectors

including production, development, administration and all employees from senior management to operators and administrative staff. The company's TPM policy is to achieve world-class status through empowerment and improvement of the overall workforce involved in TPM.

According Sweeney (2012) organizational culture is essentially a value that is believed by members of the organization for the progress of an organization. Organizational culture covers a wider and deeper aspect and becomes the basis for creating an ideal organizational climate. Sweeney (2012) explains that organizational culture affects employee performance within business organizations, including production operators in manufacturing companies. The problem of organizational culture becomes a very interesting review especially in uncertain working conditions. More cases occur in the production division where maintenance is more reactive (Render & Heizer, 2011). The machine is repaired when damage occurs and damage is frequent. A large amount of inventory in the form of sparepart piled up in the warehouse and so obsolete this is because often the operator ignores the early signs of potential damage. Operators also have no competence in maintaining the machines they operate on a daily basis. More and more manufacturing facilities are applying the Lean methodology, but most of them forget the importance of equipment and machine maintenance (Render & Heizer, 2011). In fact, the performance of the machine will largely determine the quality and productivity of a manufacturing process. It takes a strong organizational culture to improve the performance of operators and production divisions to apply Total Productive Maintenance (TPM) practices. This journal will discuss how organizational culture influences through 8 TPM pillars to improve the practice and implementation of Total Productive Maintenance (TPM) in manufacturing companies.

II. THEORY

Total Productive Maintenance (TPM) is a system or culture that takes the capabilities and skills of each individual in an organization (Ismanto, 2014). Total Productive Maintenance (TPM) creates an important strategy for manufacturing organizations in meeting customer demand in price, quality and delivery time. Total Productive Maintenance (TPM) can also help keep firms and equipment at the highest level of productivity through cooperation across sections of the organization (Ismanto, 2014). Total productive maintenance (TPM) is an improved methodology aimed at production processes designed to optimize equipment reliability and ensure efficient plant asset management through empowering employee engagement, thereby linking production, maintenance and engineering functions (Borris, 2016). TPM describes a relationship between production and maintenance in the business of continuous improvement on product quality, operational efficiency, capacity, quality assurance and safety (Borris, 2016). TPM's main idea is between production and maintenance together in small groups to exchange skills and take immediate action when dealing with problems. There are three main concepts of TPM that Nakajima has

introduced in Borris (2016) that is improving the equipment so that it can achieve the highest level of performance, keep the equipment at its highest performance and provide new equipment according to the performance set with low lifecycle cost.

The organizational culture in a company or business organization acts as a social controller and organizers of the organization based on shared values and beliefs, thus becoming the norm of group work, and operationally called work culture because it is the guideline and direction of employee's behavior (Sweeney, 2012). From this understanding it can be understood that organizational culture covers a wider and deeper aspect and instead becomes a foundation for the creation of an ideal organizational climate. Organizational culture is a common value and belief that underlies the identity of the organization, it is included in the perspective of performance, policy, regulation and compliance and measurement (Sembiring, 2012). Thus can be understood how the culture is able to provide an identity and direction for the survival of the organization, especially through the performance and performance views of employees and members of other organizations (Sembiring, 2012). Organizational culture can not simply be captured and seen by outsiders, but can be understood and felt through the behaviors of its members and their values (Sembiring, 2012).

III. METHODOLOGY

The type of research used in this journal is a type of qualitative research using descriptive approach and literature analysis comprehensively. Qualitative research methods attempt to see and analyze research results, theories, income and research performance as well as previous research recommendations to be linked to specific themes and descriptive analysis (Moleong, 2009). Qualitative approaches are used to generate descriptive data in the form of theory, prior research, and expert opinions as secondary data sources. This research is included in literature research with reference to expert opinion, previous research journals, research recommendations and theory related to Total Productive Maintenance (TPM) and organizational culture management. Descriptive because in this study is expected to get a comprehensive and systematic picture of the focus of research. While analytical because of the data obtained will be analyzed (Moleong, 2009). Initial data reduction is done as the process of selecting data and information to get a picture on the focus of the problem, the data presented descriptively

IV. DISCUSSION

A. *The Influence of Organizational Culture on Total Productive Maintenance (TPM) Practices in Manufacturing Companies*

Companies that can survive in the global market one of them because of its ability to improve productivity and production efficiency and product quality. According to Borris (2016), efforts to increase productivity can be done by evaluating the performance of production at the

company. Ismanto (2014) explains that the key factor of success of any organization is on its ability to measure the performance of its members in achieving the vision of the organization. Managers are unable to determine how the organization will do something well without measuring performance appropriately, good performance is built through an organizational culture that suits the organization's vision. Borris (2016) adds that low productivity reflects poor performance, and vice versa. Efforts to improve the company's production performance one of which can be done by applying Total Productive Maintenance (TPM). TPM has an important role in improving the company's production performance, and TPM's main goal is to achieve zero breakdown and zero defect. The company's efforts to achieve zero breakdown and zero defect is done by carrying out a comprehensive maintenance activity either independently by the production operator, or by the maintenance department. This maintenance activity is intended for production machines to be in good condition and ready to support production activities, and to avoid the appearance of defective products.

Borris (2016), Ismanto (2014) and Lycke (2013) mentioned that the concept of Total Productive Maintenance (TPM) is a combination between the development of organizational culture and measurement practice. The concept of Total Productive Maintenance (TPM) is performed within a company, the company must meet certain conditions, as follows (Borris (2016); Ismanto (2014); and Lycke (2013).

1. Sorting Out. It means concise / segregated, in this condition the operator or other employees in the production division and related to the production must have the ability of assessment and measurement to determine which goods or production equipment needed in the work area. A good organizational culture will give employees and operators the opportunity to take the necessary action (Lycke, 2013).
2. Arranging efficiently. This means neat / arrangement, which is to set the production area to support the efficiency and effectiveness of production, the right arrangement can facilitate operators and production employees to work. Identification and initiation of operators and employees of the production division are required to efficiently organize production equipment. The organizational culture that emphasizes discipline and the use of best practices in every job gives operators and employees the ability to locate and ensure all production equipment is in line with its function and place (Lycke, 2013). It also includes each item and its container has standardized marks or identities and everyone abides by the rules of storage. Compliance with the identification of goods and production equipment is part of Total Productive Maintenance (TPM) practices, the organizational culture supports these identification and compliance practices (Shah, 2012).
3. Checking through cleaning. This means cleaning, ie cleaning and checking, eliminating the source of the dirty cause, seeking the optimum conditions. The treatment of production equipment is related to the

cleanliness and the optimum condition of the machine and other production equipment. Shah (2012) found that in preventive maintenance, cleanliness is an important part of ensuring the prevention of occupational injury risks.

4. Neatness. This means maintenance or stabilization, ie implementing standardization in the workplace, maintain optimum conditions and realize the workplace error-free. Organizational culture ensures that all organizations are aware of organizational rules, this value is very important for operators and production division employees related to production equipment (Ismanto, 2014). The concept of Total Productive Maintenance (TPM) is supported by standardized maintenance and maintenance of production equipment to ensure the productivity of the manufacturing company remains in place.
5. Discipline, ie obey rules, implement work standards, develop positive habits and adhere to standardization of maintenance that supports Total Productive Maintenance (TPM). Wickramasinghe & Asank (2016) in his research found that there are disciplinary problems for manufacturing machinery operators in developing countries that result in work accidents. Wickramasinghe & Asank (2016) mentions that development of strong regulatory compliance and organizational culture can be undertaken to improve the variables of discipline to reduce workplace accidents in the production division.

B. The Influence of Organizational Culture in Pillar of Total Productive Maintenance (TPM).

Borris (2016) and Ismanto (2014) mentioned that the concept of Total Productive Maintenance (TPM) is built in 8 pillars that support each other. Total Productive Maintenance (TPM) is not only related to engineering and practice but is a good planning effort, organizing, supervising and controlling through a unique methodology involving an organizational culture approach in it. The influence of organizational culture is seen in the eight pillars as suggested by Japan Institute of Plant Maintenance - JIPM to optimize Total Productive Maintenance (Borne (2016) and Ismanto (2014):

1. Autonomous Maintenance, providing routine maintenance responsibility to the operator such as cleaning machine, lubrication / oil and machine inspection. Organizational culture affects the practice of autonomous maintenance in Total Productive Maintenance (TPM) relating to the quality and commitment of operator performance, good organizational culture ensures that the operator or worker has a high sense of ownership and unity of work and standard of maintenance. Top management that has a sustainable vision has a strong influence in improving workers' knowledge of the equipment it uses. Pillar Autonomous Maintenance mensyarakat Machines or production equipment can be ascertained clean and terlubrikasi well and can identify the potential damage before the occurrence of more severe damage. Research Almeanazel (2010) explains that a well-created organizational culture will provide more opportunities

- to workers including operators to improve their knowledge through training. Autonomous maintenance is supported by the knowledge sharing of operators and employees that make them easy to work and have a strong responsibility for production equipment.
2. Focused Improvement. Establish working groups to proactively identify problematic machines / equipment and provide solutions or improvement proposals. Organizational culture positively affects the development of group work capabilities within the organization, including recruitment and performance development (Borris, 2016). Working groups in Focused Improvement are expected to solve problems and build standardized maintenance and maintenance of production equipment, this should be supported by the performance of employees and production operators (Fahmi, Rahman, & Efranto, 2013).
 3. Planned Maintenance. Pillar Planned Maintenance schedules maintenance tasks based on the extent of damage ratio ever and / or the extent of predicted damage, this pillar serves to reduce sudden damage and can better control the level of component damage. Fahmi, Rahman, & Efranto (2013) studies mentioned that there are discipline issues of employees and production operators in performing maintenance of production equipment causing work accidents. Fahmi, Rahman, & Efranto (2013) found that it was due to a poorly functioning organizational culture and a poor managerial top management system that there was no scheduling of care to prevent risks.
 4. Quality Maintenance. This pillar is quality issues by ensuring the equipment or production machine can detect and prevent errors during production. The ability to detect these errors, the production process becomes sufficiently reliable in producing the product according to the specification at the first time, so the failure rate of the product will be controlled and the production cost becomes lower (Borris, 2016). Livia & Fewidarto's research (2016) states that quality maintenance is influenced by the recruitment capability of managers in placing operators and employees, the ability to detect very closely with work experience and knowledge.
 5. Education and Training. Pillar Training and Education is needed to fill the knowledge gap when implementing TPM (Total Productive Maintenance). Organizational culture built with sustainable vision will focus on developing work experience and employee knowledge (Render & Heizer, 2011). Lack of knowledge of the tools or machines used may cause damage to the equipment and cause low productivity of work that ultimately harm the company. The findings of Assad & Yusoff (2013) explain that with sufficient training, the operator's ability can be improved so that it can perform basic maintenance activities while the Technician can be trained in improving his ability to perform preventative maintenance and ability in analyzing damage to machinery or work equipment. Requires managerial and top management commitments on sustainable vision (Assad & Yusoff, 2013) Managerial level training can also improve the ability of the Manager to guide and educate his workforce

(Mentoring and Coaching skills) in TPM implementation (Assad & Yusoff, 2013).

6. Safety, Health and Environment. Workers must be able to work and be able to perform their functions in a safe and healthy environment. In this Pillar, the Company is required to provide a safe and healthy environment free from harmful conditions. The purpose of this Pillar is to reach an "Zero Accident" workplace target where the workplace is free from any accidents (Assad & Yusoff, 2013).
7. Administration. Administration function in TPM aims to all parties in the organization (company) have the same concept and perception including administrative staff (purchasing, planning and finance). Production efficiency can be achieved if administration begins with planning, practice, and evaluation of all aspects of optimal production and organization (Render & Heizer, 2011).
8. Development Management, a TPM pillar that uses a collection of experience from previous repair and maintenance activities to ensure the new machine can achieve optimal performance. The purpose of this pillar is for new machines or production equipment to achieve optimal performance at the shortest possible time (Render & Heizer, 2011).

V. CONCLUSIONS AND RECOMMENDATIONS

The company's ability to improve productivity and production efficiency and product quality is a prerequisite for a business organization to compete in the marketplace. Efforts to improve the company's production performance one of which can be done by applying Total Productive Maintenance (TPM). The concept of Total Productive Maintenance (TPM) is a combination between the development of organizational culture and measurement practice, where an employee or production operator must have a good organizational culture so as to develop the practice of Sorting Out, Arranging efficiently, Checking through Cleaning, Neatness and Discipline. The concept of Total Productive Maintenance (TPM) is built into 8 pillars that support each other, the pillar is not only related to techniques and practices but is a good planning effort, organizing, supervision and control through a unique methodology involving the organizational culture approach in it. Organizational culture affects all pillars of Total Productive Maintenance (TPM).

REFERENCE

- [1]. Almeanazel, O. (2010). Total Productive Maintenance Review and Overall Equipment Effectiveness Measurement. *Jordan Journal of Mechanical and Industrial Engineering* Vol 4 (4), 517-528.
- [2]. Assad, N., & Yusoff, R. (2013). Organizational Culture Influence On Total Productive Maintenance (TPM) and Operational Performance Using RASCH Model Analysis. *the Asian Journal of Technology Management* Vol 6 (2), 72-81.
- [3]. Borris, S. (2016). Total Productive Maintenance. New York: McGraw-Hill Companies.

- [4]. Fahmi, A., Rahman, A., & Efranto, R. (2013). The Implementation Of Total Productive Maintenance theory To Increase The Productivity Of Kth-8 Machine Measuring Overall Equipment Effectiveness Method (Study Case PT. Indonesian Tobacco). *Jurnal Rekayasa dan Manajemen Sistem Industri* Vol 1 (1).
- [5]. Ismanto, A. (2014). *Manajemen Pemeliharaan Mesin-Mesin Produksi*. Medan: USU Press.
- [6]. Livia, K., & Fewidarto, P. (2016). Evaluasi Peningkatan Kinerja Produksi melalui Penerapan Total Productive Maintenance di PT Xacti. *Jurnal Manajemen dan Organisasi* Vol 8 (2).
- [7]. Lycke, L. (2013). Team development when implementing TPM. *Total Quality Management* Vol 14 (2), 205-213.
- [8]. Moleong, L. (2009). *Metodologi Penelitian Kualitatif*. Bandung: Remaja Rosda Karya.
- [9]. Pradhani, S., & Senapati, A. (2014). A Review on Implementation of TPM in Manufacturing Industry. *International of Modern Engineering Research (IJMER)* Vol 4 (11), 11-31.
- [10]. Render, B., & Heizer, J. (2011). *Prinsip-Prinsip Manajemen Operasi*. Jakarta: Salemba Empat.
- [11]. Sembiring, M. (2012). *Budaya dan Kinerja Organisasi*. Bandung: Fokusmedia.
- [12]. Shah, B. (2012). *Total Productive Maintenance: A Study of Malaysian Automotive Industry*. World Congress on Engineering (hal. 49-62). London: WCE Press.
- [13]. Sweeney. (2012). *Organizational Behavior: Solution for Management*. New York : McGraw Hill.
- [14]. Wickramasinghe, G., & Asank, P. (2016). Effect Of Total Productive Maintenance Practices On Manufacturing Performance: Investigation Of Textile And Apparel Manufacturing Firms. *Journal of Manufacturing Technology Management* Vol 27 (5), 713-729.