PRIME
Public Resource Innovation Management and Excellence
November 2025, Volume 2 Number 3, 195-202
Homepage: https://primejournalpublisher.com/index.php/PRIME

Quality Control Optimization in Improving Production Management at PT. Wiman Sejahtera Makassar

Muhammad Luthfi Siraj[1], Syarifuddin[2]

[12]Administarasi Bisnis, Fakultas Ilmu Sosial dan Hukum, Universitas Negeri Makassar, Makassar, Indonesia
Email: muhammadluthfisiraj@unm.ac.id [1], syarifuddin301107@gmail.com[2]

ABSTRACT

This study aims to analyze and optimize the quality control system in improving the effectiveness of production management at PT Wiman Sejahtera Makassar. The focus of the study is how the application of the concepts of Total Productive Maintenance (TPM), Lean Manufacturing, Total Quality Management (TQM), and Six Sigma can improve equipment availability, production performance, and product quality in a sustainable manner, thereby supporting the company's competitiveness and customer satisfaction. The research method used is descriptive quantitative research with a case study approach, supplemented by performance analysis based on Overall Equipment Effectiveness (OEE) indicators, namely availability, performance, and quality. Data was obtained through direct observation, interviews with production staff, and documentation related to machine maintenance records, productivity, and product defect rates. The results of the study show that equipment availability reached 85%, production performance was 90% of the ideal speed, and product quality was 95%, indicating that there is still potential for improvement in operational efficiency and quality control. Optimizing quality control through the integration of TPM, Lean Manufacturing, TQM, and Six Sigma has been proven to reduce downtime, streamline production flow, improve employee skills and motivation, and reduce product defect rates. Thus, the implementation of a structured and sustainable quality control system can create more adaptive, reliable, and customer-oriented production management, while strengthening the company's competitiveness in the industrial market.

Keywords: Optimization, Quality Control, Production Management

INTRODUCTION

Companies often face various challenges in maintaining product quality, such as variability in raw materials, human error, and inconsistencies in the production process, which can lead to defects in the final product. High product return rates and customer complaints are important indicators that product quality still needs to be improved. In addition, increasingly fierce market competition is pushing companies to continuously improve their quality standards in order to remain competitive. Without an effective quality control system, companies risk losing customer trust and suffering financial losses.

The implementation of a good quality control system involves strict supervision at every stage of production, the use of advanced technology, and ongoing training for

employees to ensure that every product meets the specified quality standards. According to Evans and Lindsay (2020), the implementation of Total Quality Management (TQM)

involving all aspects of the organization with a focus on continuous improvement is key to achieving superior product quality. TQM includes the use of modern technology to monitor and control production processes, as well as ensuring that all employees have the skills needed to maintain product quality. Thus, companies can reduce the risk of product defects, increase production efficiency, and improve customer satisfaction. The manufacturing industry, including companies such as PT. Wiman Sejahtera in Makassar, faces significant challenges in improving product quality to meet international standards and increasingly competitive market demands. Several quality issues in production management are often caused by factors such as human error, raw material variability, and production process inconsistencies. Juran (1988) states that product quality refers to conformity with established specifications, and any deviation is considered a defect. Crosby (1979) adds that quality should be viewed as conformity to requirements, with a primary focus on defect prevention through rigorous planning and control.

PT. Wiman Sejahtera Makassar faces significant problems in terms of production management quality. Based on the company's internal reports, approximately 15% of raw materials received in the last year did not meet the specified quality standards. This resulted in 10% of final products failing quality tests, creating variations in the production process and resulting in product defects. In addition, the company also recorded product returns of 5% of total annual production, due to product defects and non-compliance with specifications. In 2023, PT. Wiman Sejahtera received 200 complaints related to product quality from a total of 5,000 units sold, indicating a customer dissatisfaction rate of 4%. To address this issue, PT. Wiman Sejahtera can implement various strategies, including improving employee training, stricter supervision of raw materials, and the application of advanced technology to monitor and control the production process.

To explore this issue further, this study uses the Overall Equipment Effectiveness (OEE) and Lean Manufacturing theories proposed by Womack, Jones, and Roos (1990), which assess the effectiveness of production management by considering availability, performance, and product quality. In particular, companies experience difficulties in maintaining the consistency of the quality of their products. This is evident from the high rate of product returns and increasing customer complaints. Deming (1986) states that to achieve high quality, companies must adopt a systematic approach to quality control that involves all departments and functions of the organization. In this context, the implementation of TQM, which emphasizes continuous improvement and the active participation of all employees in improving production management quality, will be very helpful. Womack, Jones, and Roos (1990) also emphasize the importance of reducing waste and increasing added value in the production process to improve operational efficiency and product quality. This Lean Manufacturing approach encourages customer-oriented thinking, with the main objective of producing products that meet customer needs and expectations.

PT. Wiman Sejahtera is expected to improve the quality of its production management by implementing effective quality control. This step will not only reduce defects and production losses, but also increase customer satisfaction and the company's competitiveness. To achieve this, the company needs to implement strict supervision at every stage of production, conduct ongoing employee training, and utilize technology to monitor and control the production process. In addition, PT. Wiman Sejahtera also needs to make changes to the factory layout and product quality standards in line with market needs, in accordance with Wening Galih's (2009) opinion that companies must make environmental adjustments, including changes to factory layout, process design, quality standards, and inventory management, in order to remain competitive in the market. Thus, PT. Wiman Sejahtera can achieve its long-term goal of becoming an industry leader with high-quality products and the best service.

Research Method

This study adopts a qualitative approach with a descriptive type to analyze the phenomena occurring in the field (Moleong, 2006: 04). The purpose of this method is to understand and analyze the application of quality control in production management at PT. Wiman Sejahtera Makassar, with a focus on measuring availability, performance, and product quality. Data collection was conducted through interviews, field observations, and documentation, with data validity tests covering credibility, transferability, dependability, and confirmability. The data analysis technique used was qualitative descriptive analysis, which involved in-depth interpretation and meaning. This analysis is highly relevant to the qualitative descriptive research approach, in which researchers seek to understand the phenomena occurring in relation to the issues being studied. The data analysis process follows the interactive model developed by Miles, Huberman, and Saldana (2014), which includes four stages: data collection, data condensation, data presentation, and verification or conclusion.

Results and Discussion

Based on the results of the study, it was found that the company's production effectiveness level could still be optimized by improving three key indicators in Overall Equipment Effectiveness (OEE), namely availability, performance, and quality.

1. *Availability*

The availability aspect of production equipment at PT. Wiman Sejahtera Makassar only reaches an operational level of 85%, which indicates a high level of downtime or non-operational time. Based on the research findings, the main factors affecting the low availability of equipment are the frequency of machine breakdowns, unscheduled maintenance, and a lack of real-time monitoring of equipment conditions. TPM optimization not only reduces downtime, but also increases equipment reliability, extends machine life, and ensures higher equipment availability. Thus, it is known that consistent implementation of TPM will create a smoother, efficient, and sustainable

production processes, while also increasing the company's productivity and competitiveness in the manufacturing industry. This condition indicates the need for a more structured maintenance system through the application of the Total Productive Maintenance (TPM) concept, as stated by Nakajima (1988), that the application of TPM with preventive and predictive maintenance strategies will help companies anticipate machine breakdowns before they occur, thereby minimizing disruptions to the production process. Thus, TPM optimization not only reduces machine downtime but also significantly improves equipment reliability and availability.

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2. *Performance*

Based on the results of the study, it was found that the company's production speed only reached 90% of its ideal speed, indicating a loss of efficiency caused by technical factors such as machine adjustments, delays in material supply, or inefficient workflows. To overcome this, the application of Lean Manufacturing principles (Womack, Jones, & Roos, 1990) is a strategic step, as this approach emphasizes reducing waste and increasing added value at every stage of the production process. In addition, strengthening the quality control system through the implementation of Statistical Process Control (SPC) and Total Quality Management (TQM) can help companies identify process deviations early on, improve employee work discipline, and strengthen individual responsibility for production results. The application of these techniques also encourages employees to be more active in continuous improvement, which has a direct impact on increasing productivity and work efficiency.

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3. *Quality*

The quality indicator, which measures the level of product conformity to company quality standards, is recorded at 95%, meaning that 5% of products are defective and require rework or disposal. This percentage indicates that there is still significant opportunity to improve product quality. In this context, the implementation of Total Quality Management (TQM) as described by Evans & Lindsay (2020) is an appropriate approach, as it emphasizes that quality is the responsibility of all elements of the organization. Through root cause analysis and a continuous improvement system, companies can reduce process variability and improve product quality consistency. The results of the study show that optimizing the quality control system plays a crucial role in improving the effectiveness of production management at PT. Wiman Sejahtera Makassar. By integrating the concepts of TPM, Lean Manufacturing, TQM, and Six Sigma (Pande, Neuman, & Cavanagh, 2000), companies can achieve continuous improvements in efficiency, productivity, and product quality. These improvements will not only strengthen the company's competitiveness in the market but also create a more adaptive, reliable, and customeroriented production system.

The results of this study indicate that optimizing the quality control system plays a crucial role in improving the effectiveness of production management at PT Wiman Sejahtera Makassar by integrating concepts such as Total Productive Maintenance

(TPM), Lean Manufacturing, Total Quality Management (TQM), and Six Sigma (Pande, Neuman, & Cavanagh, 2000), the company is able to target continuous improvement in terms of efficiency, productivity, and product quality. More than just increasing production figures or reducing defects, this integrated application also has implications for strengthening the company's competitiveness in the market and creating a more adaptive, reliable, and customer satisfaction-oriented production system.

The TPM aspect focuses on preventive and predictive maintenance and machine maintenance to reduce downtime, demonstrating its relevance in this study. The findings indicate that equipment availability only reached 85%, which means there is still considerable room for reducing machine downtime. This is in line with local studies such as that by Amaruddin (2023), who found that the implementation of TPM in the Indonesian automotive component sector through the eight pillars of TPM still shows average scores for each pillar that are quite far from industry standards, such as Autonomous Maintenance 4.6 on a scale of 10. Thus, the integration of TPM into the quality control system at PT Wiman Sejahtera is an important foundation for improving machine performance and increasing production output continuously. Second, the Lean Manufacturing approach complements TPM by focusing on reducing waste, improving workflows, and creating higher added value in the production process, as shown in research by Salim, Kristina & Doaly (2024) at PT Jotun Indonesia, which indicates that the implementation of lean manufacturing has successfully increased the process cycle efficiency ratio and reduced the defect rate. In the context of PT Wiman Sejahtera, the implementation of lean means tracing and improving various non-value-adding activities (such as frequent machine adjustments, waiting for materials, and less smooth production flow) that cause actual production performance to be only 90% of its ideal speed. By applying lean principles, the company can map production flow, reduce bottlenecks, and strengthen coordination between lines so that the 10% loss in ideal speed can be significantly reduced.

Third, focusing on product quality through TQM and Six Sigma is the final aspect that ties the entire production system together to achieve excellence. The research findings show a product quality level of 95%, meaning that there are still 5% of products that are defective or need to be repaired or discarded. Local research, such as that conducted by Hasan (2023) at PT Padma Soode Indonesia, which used the Six Sigma approach in the plastic injection division, shows that the company is at sigma level 4 with a DPMO that is still quite high. Another study by Aulawi & Maulana (2024) in the component industry also identified a number of product defects that could be corrected through Six Sigma, and this underlines that at PT Wiman Sejahtera, the implementation of a more systematic quality control system through root cause analysis, sigma measurement, and continuous improvement is very important to reduce defect rates and improve product quality consistency.

The integration of the four concepts of TPM, Lean Manufacturing, TQM, and Six Sigma will be very beneficial in promoting operational efficiency (through machine availability and production speed), process effectiveness (through optimal production

flow and waste reduction), and quality reliability (through in-depth quality control). The joint implementation of these concepts enables PT Wiman Sejahtera to not only pursue production and quality targets, but also to make its production system a competitive advantage that is adaptive to market changes and customer needs. Thus, the company can create a responsive production environment where machines rarely stop, production flows smoothly, and the products produced meet and exceed customer expectations, which will ultimately strengthen the company's reputation, customer loyalty, and long-term performance.

Conclusion

This study shows that PT. Wiman Sejahtera Makassar faces challenges in production management that can be overcome by applying modern production management theories that focus on increasing equipment availability through TPM, optimizing performance using Six Sigma, and improving product quality through TQM. By doing so, the company can improve overall efficiency and product quality. Therefore, it is recommended that PT. Wiman Sejahtera Makassar adopt TPM to reduce downtime, utilize Six Sigma techniques to reduce variability in production, and use modern technology to improve monitoring and control of the production process. This study recommends that PT. Wiman Sejahtera Makassar adopt TPM comprehensively to increase production equipment availability and reduce downtime, as well as explore the most effective TPM implementation strategies in the local manufacturing environment, including employee training, preventive maintenance, and the use of machine performance indicators to measure TPM effectiveness.

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PRIME (*Public Resource Innovation Management and Excellence*)
Volume 2 Number 3, November 2025. Pages 195 - 202