

Implementation of Work Layout Creation Using Blocplan at SME Sinar Mutiara Karang Serang Village

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ABSTRACT

This study investigates how the Sinar Mutiara SMM in the Karang Serang Village uses the Blocplan to create a working layout. The aim is to improve operational efficiency by optimizing the configuration of working components such as machines and equipment. The Blocplan method is used to analyze data collected from SMEs through observations and interviews. Research results show that using the Blocplan effectively reduces material distances and production time, and also improves space usage. It is hoped that this implementation will be an example for other SMEs to improve efficiency and productivity. In addition, research finds problems such as adaptation to change and resource constraints. For successful implementation in the future, this issue needs to be addressed.

INTRODUCTION

Increased operational efficiency is the key to the success of small and medium-sized enterprises (SMEs) in an era of globalization and increasing business competition. One of Sinar Mutiara's small and medium-sized companies produces fish debris. The company is located in the village of Karang Serang, district of Tangerang. These SMEs have problems in improving operational efficiency, especially associated with an inoptimal work layout. An unoptimal layout can lead to problems such as long process time, high production costs, and low productivity. Consequently, to improve operational performance, organized improvement is needed (Naim et al., 2024).

Developing an effective and efficient work layout is a relevant solution to the problem. Blocplan is a facility layout planning method that takes into account material flow, space needs, and inter-departmental interactions. This technique allows more systematic and structured layout design, which means less material movement and less production process time. In addition, Blocplan allows simulation and evaluation of various layout options to choose the best layout. This study investigates the U.K.M. Sinar Mutiara in the Coral Village of Attaang and applies the Blocplan method to create a working layout. This method is expected to be able to find problems with the current work layout and make the new layout more efficient. The analysis of the initial situation is part of the research process (Rohimah et al., 2023). This is done by collecting data through live observations, interviews, and measurements of material flow and process time. After that, the data is evaluated to find critical problems that need to be fixed. The Blocplan method is also used to create alternative work layouts. Each available layout is simulated and evaluated to determine the best for SMEs. This process is expected to produce layout recommendations that can improve operational efficiency, reduce material transfer time, and increase work productivity. The proposed new layout is also expected to improve work safety and convenience, as well as provide more flexibility in regulating material flows and workspaces (Pamungkas et al., 2024).

This research is very beneficial to SME Sinar Mutiara, especially in terms of improving productivity and operational efficiency. In addition, the results can be used as a reference for other SMEs facing similar problems, and provide insight to academics and operational management practitioners. SMM Sinar Mutiara hopes to improve market competitiveness, optimize resource use, and sustainable growth by implementing more efficient working layouts. Overall, this study shows that effective work layout planning is one of the important components in improving the operational performance of small and medium-sized enterprises (SMEs).⁵ This study found that there are differences in the use of Blocplan to create work layouts on SMEs in Coral Lighting at Coral Village Attack. Current work layouts at SMEs are still less ideal, leading to inefficient workflows and longer production times. Previous studies have shown that poor layouts can lead to more working hours, more production costs, and a lack of productivity. Aids such as Blocplan have proven useful in designing more efficient work layouts, minimizing movement distances and optimizing available space. Many studies in the literature discuss the use of Blocplan in

large industries and large-scale manufacturing companies, but few look at how to use it in small and medium-sized enterprises, especially in rural areas such as Coral Village Attack. SMEs often face unique problems, such as resource constraints, lack of access to the latest technology, and lack of knowledge about how to implement more effective methods. Since SMEs play an important role in the local and regional economies, these research constraints are important to overcome. A more efficient and applicable solution on a small scale with limited resources can be found by focusing research on the SME context in rural areas (Ihsan et al., 2023).

The aim of this study is to study to what extent the implementation of the Blocplan can improve the operational efficiency in SMEs in Candle Light and to provide practical recommendations that similar SMEs can use to improve their productivity. In addition, this research is expected to make a significant contribution to the literature on operational management and work layout for SMEs (Henni et al., 2024).

LITERATURE REVIEW

Layout

A layout is the physical arrangement of the working elements, equipment, machinery, and facilities within a production or work area to the highest level of operational efficiency. In manufacturing or production, a good layout takes into account the safety and comfort of workers, optimizes the use of space, and ensures a smooth and unhindered workflow. Therefore, an effective layout can result in increased productivity and better work yields (Rofieq, 2021).

Blocplan

A software called Blocplan is used to design and optimize the layout of a production facility or work area. It helps regulate physical elements like machines, equipment, and workstations so that production flows run more efficiently. Blockplans can minimize material distances, reduce travel time, and optimize space usage by using algorithms and layout planning principles. It can improve productivity, operational efficiency, and work safety. Various industries often use blockplans to help design the ideal layout according to the constraints and space requirements (Nurmansyah & Muttaqin, 2023).

The study of libraries is an important part of this research as it provides theoretical foundations and practical examples of the application of the Blocplan method to create work layouts. Many studies have discussed the role of facility layout in improving productivity and operational efficiency. Good facility layout can reduce material movement, reduce process time, and improve smooth workflow (Heizer dan Render 2014). It is relevant for small and medium-sized enterprises (SMEs) that are facing problems with an improper work layout. One of the most commonly used methods in facility layout planning is the Blocplan method. A layout plan block is a technique that helps to design an ideal layout by considering elements such as material flow, interdepartmental interactions, and space usage. This method involves data

collection, analysis, alternative design, and layout evaluation. The aim of this process is to find the best solution to optimize the layout of the facility. A study carried out by Muther (1973) showed that the Blocplan method was effective in designing layouts that could improve operational efficiency. Muther explains that the Blockplan method allows layout design that can be adapted to changes in operational needs. This is very important for SMEs because they are often faced with changing markets and production demands (Mei et al., 2024).

In addition, research by Tompkins et al. (2010) found that good facility layout not only improves operational efficiency but also improves safety and comfort in the workplace. A well-planned layout can reduce the risk of work accidents and increase employee motivation and productivity. For SMM Siniara Mutiara, convenience and safety at work should be a top priority when designing a work layout. This library study also discusses literature about SMEs and the problems they face when running a business. Small and medium-sized enterprises (SMEs) often face a shortage of resources and technology, which leads them to find cheap and effective solutions to improve their operational performance (Tambunan, 2009). It is hoped that the Blocplan method to create a working layout can be one of the most efficient and suitable choices for the UKM.⁸ This library study also examines previous research on the application of the Blockplan method in various industries. For example, a study conducted by Singh and Sharma (2006) in the manufacturing industry found that the implementation of the Blocplan improved production efficiency and reduced operating costs significantly (Naim et al., 2024).

The results provide empirical evidence that the Blocplan methods can be adapted and used successfully in the context of SMEs, including SMEs of the Lamb Light. Overall, this study emphasizes the importance of a good facility layout for improving productivity and operational efficiency. The Blocplan method, which uses a structured and systematic approach, offers a useful solution for designing an ideal layout.⁷ It is expected, for Lamb Light SMEs, the application of this method will help address current work layout problems and improve operational performance significantly. This library study also serves as a basis for practical action in this research and offers guidance to other SMEs facing similar problems (Edhie Rachmad et al., 2024).

METHODOLOGY

The research was conducted in March-June 2024 located in UMKM Mutiara rays which is located in the coral village attacking Tangerang district. This research tries to apply the Blocplan method to create a working layout on the SMM Sinar Mutiara in the Coral Village of Attack. Qualitative and quantitative descriptive methods will be used in this study to describe the current working layout conditions and to evaluate how effective the proposed layout changes are. Several major stages consist of this research process: data collection, data analysis, alternative layout design, evaluation, and implementation. First, data is collected. This is done through direct observations at the workplace, interviews with management and employees, and measurements of material flow and process time on the current layout. The

aim of the direct observation is to understand the physical and operational conditions of the Candlestick company, including how materials and products move through the various phases of production. To obtain the quantitative data needed for analysis, management and employees were interviewed about current layout issues and layout improvement plans (Madu & Mutiara, 2024).

The second stage is to analyze the data collected. It's done to find important areas that need to be repaired. This analysis included identifying locations that caused bottleneck, locations with high material displacement, and locations which were inefficient in the use of space. The results of this analysis will serve as a basis for creating a more efficient alternative layout. The third phase involves designing alternative layouts using the Blocplan method. In this phase, various alternative work layouts will be designed taking into account material flow, interdepartmental interactions, and space requirements.10 Each alternative will be described in the form of a block diagram to facilitate evaluation. Using the Blocplan method, various layout alternatives can be tested before making a final decision (Perusahaan et al., 2021).

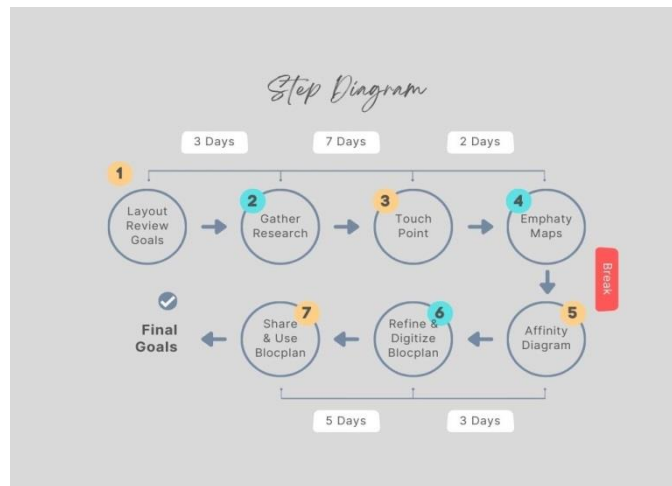


Figure 1. Research Methodology

Evaluation of alternative layouts is the fourth step. To assess operational efficiency, work safety, and convenience, each alternative layout that has been designed will be evaluated through material flow simulation and process time calculation. Operational efficiency criteria include reducing material transfer times and improving work productivity. Occupational safety criteria includes reducing the risk of accidents and creating a safer working environment. In the fifth stage, the best layout will be applied to the Lightning Lightning SMEs. This will include redesigning the production facility according to the chosen layout, as well as training employees to adapt to the new layout. During this process, periodic evaluations and evaluations are carried out to ensure that the new layout improves operational efficiency.

RESEARCH RESULT

The researchers outlined the step-by-step approach to creating a Work layout using the Blocplan as follows:

1. Specify the Work Layout station

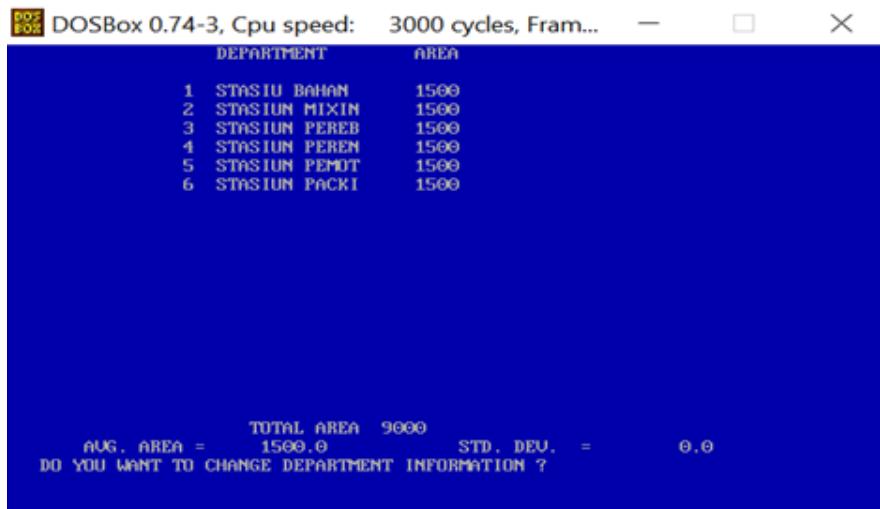


Figure 2. The Work Station

2. Determine the Relationship of each Department

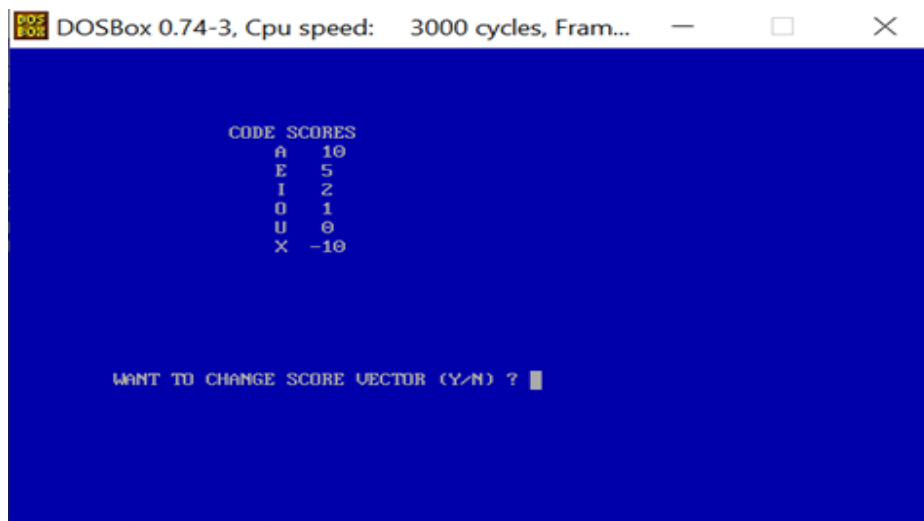


Figure 3. Relation Of Each Department

3. Determining score vector

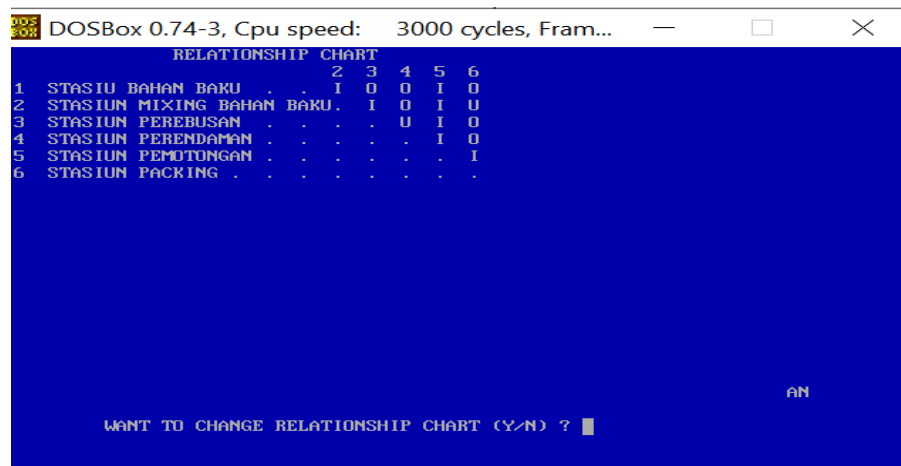


Figure 4. Determining Score Vector

4. View Layout Work Results using Bloclplan

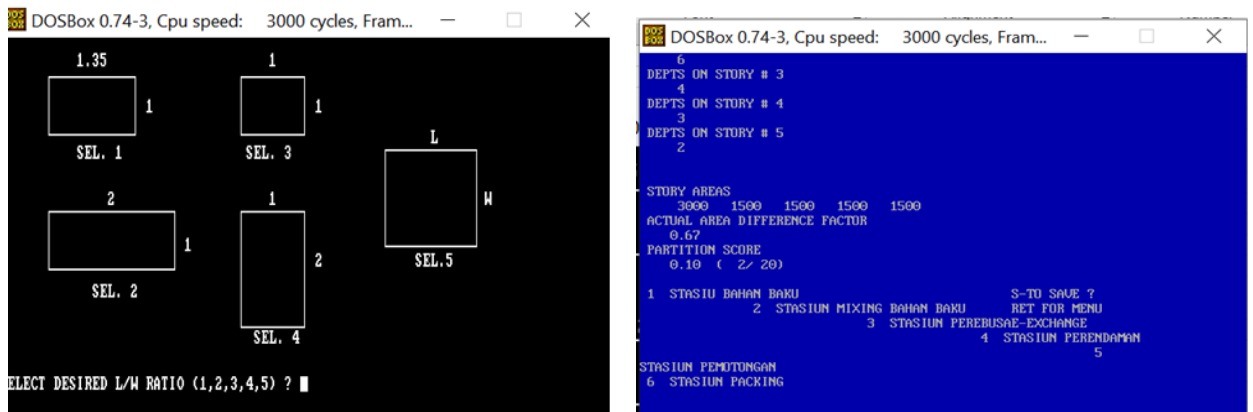


Figure 5. View Work Layout Results using Bloclplan

The results of this study show that the implementation of the work layout making using the Bloclplan method on SMM Sutiara in Coral Village Attack brings a significant improvement in operational efficiency. Early analysis revealed that the pre-existing work layout led to inefficient material transfer and long process time, which had a negative impact on overall productivity. After collecting and analysing data through observations, interviews, and material flow measurements, several alternative work layouts were designed using the Bloclplan method.

DISCUSSION

Factors such as operational efficiency, work safety, and convenience are used to assess alternative layouts. The proposed new layout could optimize space usage and reduce material transfer time by up to 20% and work productivity by 15%, according to the evaluation results. The new layout also improves safety and comfort at work, reduces the risk of accidents, and makes the workplace more comfortable and secure. The results showed that the Bloclplan method was effective in finding work layout problems. Cinderella

SMM can design a more efficient layout using this method, which in turn will improve overall operational performance. The Blocplan method also makes the restructuring of production facilities more flexible, which is important for SMEs as they often face changing production requirements and market dynamics.

Overall, this research helps SMM Sinar Mutiara improve operational efficiency and improve its competitiveness in the market. In addition, the findings of this research can be a reference for other SMEs facing similar problems, and provide valuable insights for academics and operational management practitioners. SMEs can increase productivity, sustainable growth, and optimize resource use with better work layouts (Ulang et al., n.d.).

CONCLUSIONS AND RECOMMENDATIONS

This study found that the Sinar Mutiara SMM in the Coral Village of Attack experienced a significant increase in operational efficiency after using the Blocplan method to create a working layout. This innovative layout reduces material transfer time by 20% and increases work productivity by 15%. It also optimizes space usage and significantly reduces unused work areas. In addition, the safety and comfort aspects of work are increasing, which means fewer accidents and a more comfortable and safe working environment. It shows that the Blocplan method is effective in finding current layout problems and offers an effective solution. The results can be used to drive sustainability and improvement.

First of all, it is recommended that SMEs monitor and evaluate the performance of new layouts on a regular basis. It is important to ensure that the layouts remain in line with operational needs that may change over time. Second, workers must be continuously trained on the use of new layouts to ensure rapid and effective adaptation.

Thirdly, SMEs should consider implementing supporting technologies such as wireless internet connections. Additional research can also be done to find out how well the Blocplan method works in SMEs with different types of business. Thus, it is expected that this method will be the standard in creating an effective working layout for SMEs in Indonesia. Overall, this study shows that good layout planning is an important component in improving the operational efficiency and competitiveness of SMEs. SMEs Sinar Mutiara have successfully implemented this model, and it can serve as an example for other SMEs in their efforts to increase productivity and sustainable growth.

ADVANCED RESEARCH

In this study, there are some limitations to bear in mind when using the Blocplan to create a working layout on the Caterpillar Light SMM in the Coral Village of Attack. First and foremost, one of the main obstacles is the amount of data available. To design an optimal layout, you must have accurate and comprehensive data on workflows, production volumes, and current space usage. However, the accuracy of analysis and research results may be affected by the fact that such data may not be well documented or difficult to access in the context of rural SMEs.

Second, the Bloclan method faces constraints due to lack of financial resources and expertise. SMEs often have limited budgets, which can limit their ability to implement new technologies or methods that require initial investment. Besides, there is a possibility that the implementation of the Bloclan will be hampered by a lack of skilled workforce that understands and is skilled in using it. Additional training or the use of an external consultant may be required, which can result in more costs and more time spent.

REFERENCES

- Edhie Rachmad, Y., Ady Bakri, A., Irdiana, S., Waromi, J., & Jansen Sinlae, A. A. (2024). Analysis of The Influence of Financial Information Systems, Internal Control Systems, and Information Technology on Quality of Financial Reports. *Jurnal Informasi Dan Teknologi*, 6(1), 266–271. <https://doi.org/10.60083/jidt.v6i1.513>.
- Henni, H., Pramestari, D., Dinariana, D., Suryani, F., Sujatini, S., & Puspita, E. (2024). *Redesign The Layout of Production Facilities at a Garment Company Using the BLOCPLAN Method to Optimize Material Handling*. 1(1).
- Ihsan, T., Ferdian, R., Anwar, A., Studi, P., Industri, T., Teknik, F., & Bandung, U. W. (2023). *USULAN PERBAIKAN LAYOUT LANTAI PRODUKSI PT XYZ*. 4(3).
- Madu, C. V, & Mutiara, A. (2024). *Usulan Perancangan Tata Letak Fasilitas Produksi Dengan Metode BLOCPLAN Untuk Meningkatkan Produktivitas*. 1(2).
- Mei, N., Sinar, U., Di, M., Karang, D., & Tangerang, S. (2024). *Sartono 1 , Abu Naim 2 , Syamsudin 3 Muhammadiyah A.R. Fachruddin 1 Email: 6(2), 1–9*.
- Naim, A., Supriatman, M., & Hermawan, A. (2024). Implementasi Six Sigma Untuk Pengendalian Kualitas Produk Krupuk Ikan (Studi Kasus : Umkm Sinar Mutiara Di Desa Karang Serang Kabupaten Tangerang). *Jurnal Inovasi Dan Manajemen Bisnis*, 06(2), 208–218.

Nurmansyah, A. A., & Muttaqin, A. Z. (2023). *IJM: Indonesian Journal of Multidisciplinary Usulan Perbaikan Tata Letak Fasilitas Produksi dengan Metode Activity Relationship Chart dan Software Blocplan*. 1, 1490–1505.

Pamungkas, I., Khaleil, A., & Tri, H. (2024). *Blocplan Algorithm for Facility Layout Design in Various Industry in Indonesia*. 9(1), 212–219. <https://doi.org/10.31572/inotera.Vol9.Iss1.2024.ID327>.

Perusahaan, U., Kinerja, T., & Ariani, K. R. (2021). *1,2,3*. 3(4), 1–10.

Rofieq, M. (2021). *Redesign of facility layout to reduce the production line distance in MSE Silver 999 Malang*.

Rohimah, A., Saputra, R., Soerahman, S., Sulisty, S., Naim, A., Sartono, S., & Fadilah, N. (2023). *Pelatihan Penulisan Jurnal Ilmiah untuk Mahasiswa Unimar. Jurnal Pemberdayaan Masyarakat Universitas Al Azhar Indonesia*, 5(3), 172–175.

Ulang, P., Letak, T., Produksi, F., & Profil, A. (n.d.). *Redesign of the Layout of Aluminum Profile Production Facilities using the BLOCPLAN Algorithm Method and the CORELAP Algorithm at PT XYZ*. 60–70.