Improving Shoes Production Flow in a SME Using a Theory of Constraints (TOC) Approach

Davina Putri Dania Kesuma*, Endang Prasetyaningsih, Ajrina Febri Suahati

Study Program of Industrial Engineering, Faculty of Engineering, Bandung Islamic University, Indonesia.

davinaputri03@gmail.com, endangpras@gmail.com, afsuahati@gmail.com

Abstract. 'Rumah Sepatu' is a small and medium-sized enterprise (SME) located in Bandung, Indonesia. It is operating in the footwear manufacturing industry under a make-to-order (MTO) market response strategy. The production system consists of several workstations, namely Pattern Marking, Upper Assembly, Initial Quality Control, Upper Lasting, Outsole Oven Processing, Outsole Cooling, and the Assembly of the Upper and Outsole. Each workstation performs different operations with varying processing times. Significant differences in processing time among these workstations lead to workload imbalance along the production line. This imbalance causes the accumulation of work in process (WIP) and results in the emergence of bottlenecks, which hinder the smooth flow of production and prevent the fulfillment of customer demand. This study aims to identify and manage the bottleneck in the production flow using the Theory of Constraints (TOC) approach. The research methodology includes bottleneck identification, production quantity optimization using Linear Programming, the implementation of Drum-Buffer-Rope (DBR) scheduling, and improvement actions focused on the bottleneck workstation. The results indicate that the Upper Assembly workstation is the primary bottleneck, with a workload level of 181.78%. Under the existing production conditions, the system is unable to fully satisfy customer demand. The proposed improvement, implemented by adding one permanent operator at the Upper Assembly workstation, increases production capacity from 645 units to 1,171 units per month. As a result, system throughput rises from IDR30,044,100 to IDR68,591,700, representing an increase of 128.28%.

Keywords: *Theory of Constraints, Linear Programming, Drum-Buffer-Rope.*

*davinaputri03@gmail.com

A. Introduction

Footwear manufacturing small and medium-sized enterprises (SMEs) play an important role in supporting the economy [12]; however, they are often confronted with the accumulation of work in process (WIP) and workload imbalance across workstations. Such imbalance may trigger bottlenecks at specific workstations, resulting in disrupted production flow and the inability to fulfill customer orders. One footwear manufacturing SME that experiences these issues is '*Rumah Sepatu*'[1]

'*Rumah Sepatu*' is located in Bandung, Indonesia, and has been operating since 2002. In its operations, the company produces footwear based on customer orders by adopting make-to-order (MTO) and engineer-to-order (ETO) market response strategies. The MTO strategy refers to a production approach in which manufacturing activities are initiated only after confirmed customer orders are received [5]. In contrast, the ETO strategy emphasizes customized product design and engineering based on specific customer requirements prior to the commencement of the manufacturing process [11][2]

The products are classified into two categories, namely new orders and repeat orders. New orders fall under the ETO system, while repeat orders are categorized as MTO products. The distinction between these categories lies in the production stages involved. New orders require new product designs and pattern development from the initial stage, whereas repeat orders utilize existing designs from previous orde[3]

This study focuses on repeat order products due to their relatively standardized production flow and higher production frequency compared to new order products. The products include Product T, Product W, and Product S. Based on demand data for April 2025, total demand reached 1,171 pairs of shoes, consisting of 773 pairs of Product T, 231 pairs of Product W, and 167 pairs of Product S.

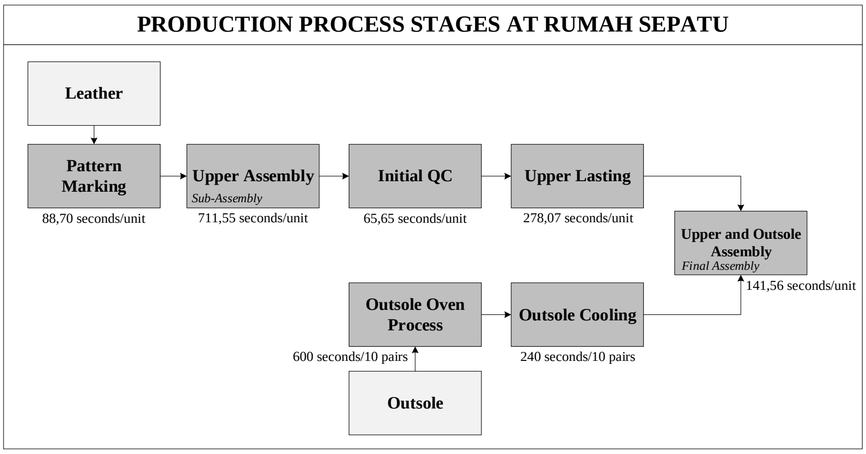

Figure 1. Stages of the 'Rumah Sepatu' Production Process

Figure 1 illustrates the production process stages of repeat order products, which consist of several workstations, two main material flows, and processing time each workstations. All workstations are interdependent, exhibit different processing times, and production capacities. These materials pass through different workstations and are assembled at the final workstation. The leather material process flows through the Pattern Marking, Upper Assembly, Initial QC, and Upper Lasting workstations. Meanwhile, the outsole process begins at the Outsole Oven and Outsole Cooling workstations. Both components are subsequently assembled at the Upper and Outsole Assembly workstation.

Observations indicate significant differences in processing times among workstations, for example, between the Pattern Marking workstation with a processing time of 88.70 seconds per unit and the Upper Assembly workstation with 711.55 seconds per unit. It should be noted that the processing times at the Outsole Oven Process and Outsole Cooling workstations are measured on a batch basis rather than a per-unit basis, where one batch consists of 10 pairs of shoes. These differences reflect workload imbalance across the production line. According to [8], a production flow is considered balanced when processing times across workstations are relatively similar. This imbalance results in the accumulation of WIP, particularly between the Pattern Marking and Upper Assembly workstations. Furthermore, Table 1 shows that the production capacity of the Upper

Assembly workstation is insufficient to meet the demand in April, in contrast to other workstations that are able to meet demand.

Table 1. Comparison Between Monthly Production Capacity in Each Process with Demand

No	Workstation	Processing Time (sec/unit)	Available Capacity (sec/day)	Monthly Capacity (units/month)	Demand (units/month)	Remarks
1	Pattern Marking	88,34	28.800	7.824,06	2.342	Meets
2	Upper Assembly	714,77	28.800	967,02	2.342	Does not meet
3	Initial QC	65,05	28.800	10.625,24	2.342	Meets
4	Upper Lasting	276,90	28.800	2.496,17	2.342	Meets
5	Outsole Oven Process	600	28.800	1.152	117,1	Meets
6	Outsole Cooling	240	28.800	2.880	117,1	Meets
7	Upper and Outsole Assembly	141,79	28.800	4.874,76	2.342	Meets

Within the context of the Theory of Constraints (TOC), the Upper Assembly workstation is identified as a capacity constraint in the form of a bottleneck, defined as a resource whose capacity is lower than the production requirements of the system [14]. A key TOC principle relevant to this case is “balance the flow, not the capacity,” which emphasizes maintaining a smooth production flow rather than maximizing the utilization of every workstation. This principle is closely related to the concept that “activation is not equal to utilization,” whereby excessive operation of non-bottleneck workstations only increases WIP without improving system throughput.

One of the primary methods used to implement TOC principles in a production environment is Drum-Buffer-Rope (DBR), i.e a scheduling approach to control production flow by positioning the bottleneck as the central control point of the system [3]. In this approach, the Drum sets the production pace according to the constraint capacity, the Buffer provides time protection against disruptions, and the Rope regulates material release to ensure alignment with bottleneck capacity, thereby maintaining a stable and efficient production flow [2].

In this study, the production flow issues observed at ‘*Rumah Sepatu*’ are addressed using the TOC approach. TOC has been widely applied in previous studies to resolve bottleneck-related problems across various production systems. Prior research demonstrates that TOC implementation—through bottleneck identification, DBR scheduling, and integration with other methods such as Linear Programming and the Campbell–Dudek–Smith (CDS) approach—can improve production system performance, reduce delays, and decrease flow imbalance. A summary of the related studies used as references in this research is presented in Table 2.

Based on the identified problems, this study is conducted to address two main issues: identifying the workstations that act as bottlenecks and constrain the production flow, and determining appropriate strategies to manage these bottlenecks in order to improve flow continuity and ensure timely order fulfillment. Accordingly, the objective of this study is to identify constraint workstations within the production process and to propose improvement actions aimed at mitigating bottlenecks and enhancing the overall production flow.

Table 2. Previous Research

No	Researcher	Method	Research Object	Research Conducted
1	Kemaluddin and Prasetyaningsih (2022)	Theory of Constraints (TOC) with CRT, Drum-Buffer-Rope,	Anoa 6x6 Vehicle Ramp	Identify the cause of bottlenecks in the production line of ramp door components of PT Pindad (Persero) Anoa 6x6 vehicles

No	Researcher	Method	Research Object	Research Conducted
		Linear Programming, and Campbell-Dudeck-Smith Scheduling (CDS)	Door Components	and eliminate these bottlenecks by implementing TOC along with CDS scheduling.
2	Yudistira and Muhammad (2022)	Theory of Constraints (TOC)	Brochures and Boxes	Overcoming delays in Duta Media's CV due to printing machine capacity by optimizing production scheduling. Print workstations experience bottlenecks by 108.87%. As a result of the calculation at the TOC stage, an additional working time (overtime) is needed by 1,022.06 minutes.
3	Bidiawati and Setiawati (2020)	Theory of Constraints (TOC), Drum-Buffer-Rope and Linear Programs	Furniture	Overcome bottlenecks at sanding stations using the Drum-Buffer-Rope method. The production schedule is rearranged with certain priority, which shortens production time and reduces idle time.
4	Deferinanda, Prasetyaningsih, and Amaranti (2019)	Theory of Constraints (TOC), Drum-Buffer-Rope and Linear Programs	Shoes	Identify bottlenecks in the upper production line using TOC and determine solutions through DBR approaches and linear programs. The overtime proposal based on the most optimal improvement recommendations reduces the imbalance of the production line from 18.96% to 4.28%.

B. Method

The research methodology employed in this study is structured in a systematic and sequential manner to ensure that the research problems can be analyzed clearly and comprehensively. In general, the research stages begin with processing time measurement to obtain standard time, followed by production flow analysis using the TOC approach. The overall research framework and stages are illustrated in the research flowchart shown in Figure 2.

Processing Time Measurement and Standard Time Calculation

The initial stage of the study involves measuring processing times at each workstation involved in the production of Product T, Product W, and Product S. Time measurements were conducted directly on the production floor using a time study method with a stopwatch. The collected data represent cycle times, which were subsequently tested for uniformity and adequacy to ensure data representativeness [13]. Once the data were confirmed to be uniform and sufficient, cycle time, normal time, and standard time were calculated. Normal time was determined by considering operator performance rating factors, while standard time was obtained by incorporating allowance factors.

Constraint Identification

Constraint identification was performed by analyzing workstations whose production capacity was lower than the required demand. Workstations with workload levels exceeding 100% were identified as bottlenecks. The workload level was calculated using the following equation:

$$\text{Workload (\%)} = (\text{Required Capacity}/\text{Available Capacity}) \times 100\% \quad ...(1)$$

Constraint Exploitation

After the bottleneck was identified, the next stage involved constraint exploitation, which aims to maximize the utilization of the bottleneck workstation without adding additional resources [7]. In this stage, a Linear Programming model was applied to determine the optimal production combination that maximizes system throughput. The model was formulated with the objective of maximizing throughput, subject to constraints related to available workstation capacity and product demand. The formulated model was subsequently solved using WinQSB software to obtain the optimal production combination.

Non-Constraint Subordination

The subordination stage aims to align the performance of non-bottleneck workstations with the bottleneck in order to support its operation [7]. In this stage, the DBR concept is implemented, in which the bottleneck workstation acts as the drum that regulates the production pace. A buffer is placed upstream of the bottleneck to protect the system from disruptions, while the rope is used to control material release so that it remains aligned with the bottleneck capacity.

Constraint Elevation

The final stage is constraint elevation, which involves increasing the capacity of the bottleneck when the exploitation and subordination stages are insufficient to meet demand. In this study, constraint elevation is proposed by adding one permanent operator to the Upper Assembly workstation. The impact of this proposed elevation is evaluated by comparing production capacity and throughput before and after the improvement.

C. Result and Discussion

The results and discussion are presented in a structured manner following the research methodology stages described in the previous section, starting from processing time measurement and standard time calculation to the constraint elevation stage. The following subsections discuss the results obtained from the study.

Initial Findings

The initial findings of this study are based on processing time measurements, standard time calculations, and implementing TOC. The results indicate notable differences in processing times, with the Upper Assembly workstation exhibiting the longest standard time, which leads to workload imbalance and the accumulation of work in process WIP. These preliminary results suggest the presence of a production constraint within the system, which will be further analyzed and discussed in the following section.

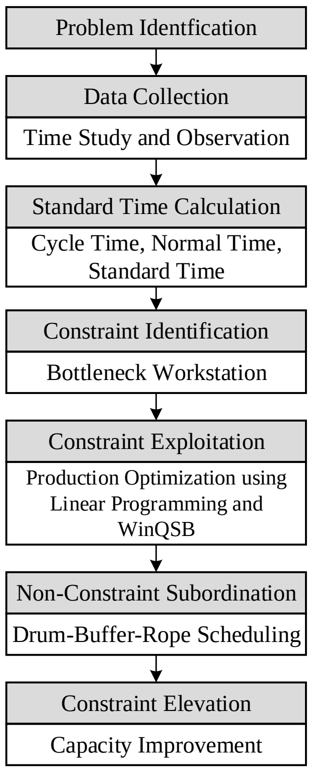

Figure 2. Research Stages

Standard Time Calculation

Standard time was determined based on processing time measurements obtained through direct observation of operators to identify the duration of each process [6]. Measurements were conducted at each workstation and subsequently tested for data uniformity and adequacy. Once the processing time data met the criteria for uniformity and adequacy, the data were considered valid for further analysis. The average processing time was then calculated to obtain the cycle time, which was subsequently used to determine normal time and standard time. The calculated standard time served as the basis for capacity analysis to assess the workload at each workstation. The results of the standard time calculations are presented in Table 3.

Table 3. Standard Time Recapitulation per Workstation

No	Workstation	Standard Time	
		Seconds	Minutes
1	Pattern Marking	127,25	2,12
2	Upper Assembly	1.072,96	17,88
3	Initial QC	98,36	1,64
4	Upper Lasting	415,19	6,92
5	Outsole Oven Process	900	14,99
6	Cooling Outsole	360	6
7	Upper and Outsole Assembly	212,60	3,54

Constraint Identification

The required capacity at each workstation was calculated based on the standard time and product demand. Meanwhile, the available capacity was determined by considering the number of working days, daily working hours, and the number of shifts, resulting in an available capacity of 11,520 minutes for each workstation. The comparison between required and available capacity was evaluated using Equation [1] to determine the workload level at each workstation. The workload analysis indicates that only the Upper Assembly workstation exhibits a workload exceeding 100%, implying that the required capacity at this workstation surpasses the available capacity. Accordingly, the Upper Assembly workstation is identified as the primary bottleneck in the ‘Rumah Sepatu’ production system. A summary of the workload analysis for each workstation is presented in Table 4.

Table 4. Recapitulation of Workload Calculation Results

No	Workstation	Kap. Required (Minutes)			Required Cap. (Minutes)	Available Cap.	Workload	Remarks
		T	W	S				
1	Pattern Marking	1.639,42	489,92	354,18	2.483,52	11.520	21,56%	Non-Bottleneck
2	Upper Assembly	13.823,32	4.130,90	2.986,41	20.940,63	11.520	181,78%	Bottleneck
3	Initial QC	1.267,20	378,68	273,77	1.919,65	11.520	16,66%	Non-Bottleneck
4	Upper Lasting	5.349,03	1.598,48	1.155,61	8.103,13	11.520	70,34%	Non-Bottleneck
5	Outsole Oven Process	1.159,04	346,36	250,40	1.755,80	11.520	15,24%	Non-Bottleneck
6	Cooling Outsole	463,61	138,54	100,16	702,32	11.520	6,10%	Non-Bottleneck
7	Upper and Outsole Assembly	2.739,03	818,52	591,74	4.149,29	11.520	36,02%	Non-Bottleneck

Table 4 indicates that workload levels across most workstations remain below capacity, while the Upper Assembly workstation operates beyond its available capacity. This confirms that the Upper Assembly workstation functions as the primary bottleneck and becomes the main factor constraining overall production flow.

Constraint Exploitation

Constraint exploitation was conducted using a Linear Programming model to determine the optimal production combination that maximizes system throughput while considering capacity limitations [4]. The model evaluates feasible production combinations under capacity and demand constraints to identify the maximum achievable throughput. The model is formulated in terms of an objective function and a set of constraint functions, as presented in Equations [8] to [19], which are derived from the general formulations shown in Equations [3] to [6].

- Purpose function:

$$\text{Maximation } Z = 56.700\,T + 59.700\,W + 65.700\,S \qquad ...(7)$$

- Limiting resources:

$$2{,}12\ T + 2{,}12\ W + 2{,}12\ S \leq 11.520 \qquad ...(8)$$
$$17{,}88\ T + 17{,}88\ W + 17{,}88\ S \leq 11.520 \qquad ...(9)$$
$$1{,}64\ T + 1{,}64\ W + 1{,}64\ S \leq 11.520 \qquad ...(10)$$
$$6{,}92\ T + 6{,}92\ W + 6{,}92\ S \leq 11.520 \qquad ...(11)$$
$$0{,}75\ T + 0{,}75\ W + 0{,}75\ S \leq 11.520 \qquad ...(12)$$
$$0{,}30\ T + 0{,}30\ W + 0{,}30\ S \leq 11.520 \qquad ...(13)$$
$$3{,}54\ T + 3{,}54\ W + 3{,}54\ S \leq 11.520 \qquad ...(14)$$
$$T \leq 773 \qquad ...(15)$$
$$W \leq 23 \qquad ...(16)$$
$$S \leq 167 \qquad ...(17)$$
$$T, W, S \geq 20 \qquad ...(18)$$

Equation [7] represents the objective function that aims to maximize the value of Z (profit), while Equations [8] to [14] sequentially represent the capacity constraints for each workstation. Demand constraints for each product are expressed in Equations [15] to [17], whereas Equation [18] specifies the minimum order quantity (MOQ) constraint of 20 pairs. The formulated model was subsequently solved using WinQSB software, and the optimization results are presented in Figure 3.

	08:50:17		Thursday	October	23	2025		
	Decision Variable	Solution Value	Unit Cost or Profit c(j)	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c(j)	Allowable Max. c(j)
1	X1	246.2953	56,700.0000	13,964,950.0000	0	basic	0	59,700.0000
2	X2	231.0000	59,700.0000	13,790,700.0000	0	basic	56,700.0000	M
3	X3	167.0000	65,700.0000	10,971,900.0000	0	basic	56,700.0000	M
	Objective	Function	(Max.) =	38,727,540.0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	1,365.9060	<=	11,520.0000	10,154.0900	0	1,365.9060	M
2	C2	11,520.0000	<=	11,520.0000	0	3,171.1410	7,473.8400	20,937.4800
3	C3	1,056.6440	<=	11,520.0000	10,463.3600	0	1,056.6450	M
4	C4	4,458.5240	<=	11,520.0000	7,061.4760	0	4,458.5240	M
5	C5	483.0282	<=	11,520.0000	11,036.9700	0	483.0283	M
6	C6	193.2113	<=	11,520.0000	11,326.7900	0	193.2109	M
7	C7	2,280.8050	<=	11,520.0000	9,239.1940	0	2,280.8060	M
8	C8	246.2953	<=	773.0000	526.7047	0	246.2953	M
9	C9	231.0000	<=	231.0000	0	3,000.0000	20.0000	457.2953
10	C10	167.0000	<=	167.0000	0	9,000.0000	20.0000	393.2953
11	C11	246.2953	>=	20.0000	226.2953	0	-M	246.2953
12	C12	231.0000	>=	20.0000	211.0000	0	-M	231.0000
13	C13	167.0000	>=	20.0000	147.0000	0	-M	167.0000

Figure 3. Results Linear Programming Using WinQSB Existing Condition

Figure 3 presents the optimal production combination obtained from the optimization model, with production quantities of 246.29 units for Product T, 231 units for Product W, and 167 units for Product S. The results indicate that the demand for Product W and Product S can be fully satisfied, whereas the demand for Product T cannot be completely fulfilled, resulting in a shortage relative to the total demand for April 2025. This condition is attributed to the limited capacity of the Upper Assembly workstation, which has been identified as the system bottleneck. Therefore, the subsequent improvement step is carried out through non-constraint subordination to align the production flow with the capacity of the bottleneck workstation.

Non-Constraint Subordination

The subordination stage is implemented using the DBR concept to align the performance of non-bottleneck workstations with the bottleneck capacity. In this implementation, the Upper Assembly workstation is designated as the drum that regulates the production pace of the entire system. A buffer is positioned upstream of the bottleneck as a time buffer to anticipate potential disruptions, with a required buffer size of 393 pairs of shoes, equivalent to approximately 20 days of production, to ensure continuous bottleneck operation. Furthermore, the rope functions to control material release from preceding workstations in accordance with the requirements and capacity of the bottleneck workstation.

With the implementation of DBR, production at non-constraint workstations is no longer driven by maximum capacity utilization but is instead synchronized with the bottleneck requirements. As a result, WIP accumulation can be reduced, and the production flow becomes more controlled and stable. However, the results indicate that the required buffer remains relatively large, suggesting that DBR implementation alone is not sufficient to fully balance the production flow. Consequently, further improvement actions through capacity enhancement at the bottleneck workstation are required. The application of DBR in the '*Rumah Sepatu*' production system is illustrated in Figure 4.

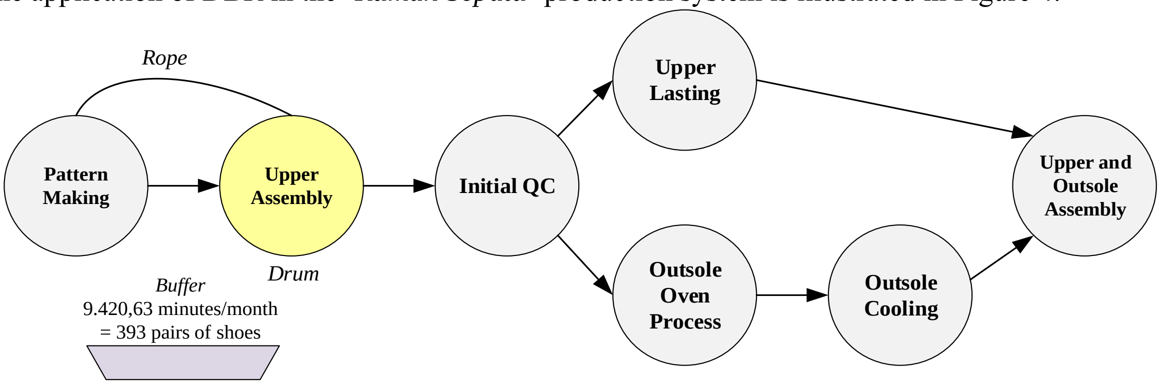

Figure 4. Application Drum-Buffer-Rope

Constraint Elevation

The constraint elevation stage was conducted to increase the capacity of the Upper Assembly workstation after the subordination stage was found to be insufficient. Capacity enhancement was achieved by adding labor, with two alternatives evaluated: a freelance worker and a permanent worker. Both alternatives resulted in an improved capacity of 23,040 minutes with a workload level of 91%. However, the addition of a permanent worker incurred a lower monthly cost of IDR 3,120,000 compared to IDR 5,260,000 for a freelance operator.

The selected alternative was subsequently re-modeled using Linear Programming by adjusting the capacity of the Upper Assembly workstation and solved using WinQSB software, as presented in Figure 5. The optimization results indicate optimal production quantities of 773 units for Product T, 231 units for Product W, and 167 units for Product S, achieving a maximum profit of IDR 68,591,700 and fully satisfying all demand. Slack value analysis shows that all workstations retain residual capacity, indicating that no bottlenecks remain within the production system.

	08:51:36		Thursday	October	23	2025		
	Decision Variable	Solution Value	Unit Cost or Profit c(j)	Total Contribution	Reduced Cost	Basis Status	Allowable Min. c(j)	Allowable Max. c(j)
1	X1	773.0000	56,700.0000	43,829,100.0000	0	basic	0	M
2	X2	231.0000	59,700.0000	13,790,700.0000	0	basic	0	M
3	X3	167.0000	65,700.0000	10,971,900.0000	0	basic	0	M
	Objective	Function	(Max.) =	68,591,700.0000				
	Constraint	Left Hand Side	Direction	Right Hand Side	Slack or Surplus	Shadow Price	Allowable Min. RHS	Allowable Max. RHS
1	C1	2,482.5200	<=	11,520.0000	9,037.4810	0	2,482.5200	M
2	C2	20,937.4800	<=	23,040.0000	2,102.5210	0	20,937.4800	M
3	C3	1,920.4400	<=	11,520.0000	9,599.5600	0	1,920.4400	M
4	C4	8,103.3200	<=	11,520.0000	3,416.6800	0	8,103.3200	M
5	C5	877.8987	<=	11,520.0000	10,642.1000	0	877.8984	M
6	C6	351.1595	<=	11,520.0000	11,168.8400	0	351.1592	M
7	C7	4,145.3400	<=	11,520.0000	7,374.6600	0	4,145.3400	M
8	C8	773.0000	<=	773.0000	0	56,700.0000	20.0000	890.5907
9	C9	231.0000	<=	231.0000	0	59,700.0000	20.0000	348.5907
10	C10	167.0000	<=	167.0000	0	65,700.0000	20.0000	284.5907
11	C11	773.0000	>=	20.0000	753.0000	0	-M	773.0000
12	C12	231.0000	>=	20.0000	211.0000	0	-M	231.0000
13	C13	167.0000	>=	20.0000	147.0000	0	-M	167.0000

Figure 5. Results Linear Programming Using WinQSB Proposed Improvement

As shown in Figure 5, the increased capacity at the Upper Assembly workstation eliminates the capacity constraint, as reflected by positive slack values across all workstations. This improvement results in a significant increase in system throughput, which rises to IDR 68,591,700 from the previous value of IDR 30,044,100 reported in Figure 3. The results indicate that the production system is capable of fully meeting customer demand, consisting of 773 units of Product T, 231 units of Product W, and 167 units of Product S. These findings confirm that capacity enhancement at the bottleneck workstation enables complete demand fulfillment across all product types.

Analysis and Discussion

The results confirm that the imbalance in processing times and workloads across workstations significantly influences the overall performance of the production system. In line with the Theory of Constraints (TOC), the identification of the Upper Assembly workstation as the primary bottleneck is consistent with the principle that system throughput is governed by its weakest constraint. This principle emphasizes that overall system performance is not determined by the capacity of individual non-bottleneck workstations.

The implementation of constraint exploitation through Linear Programming demonstrates that, under existing capacity conditions, the system is unable to fully satisfy total demand, particularly for Product T. Although the application of Drum-Buffer-Rope (DBR) scheduling improves flow coordination and reduces uncontrolled work-in-process (WIP) accumulation, the large buffer requirement indicates that subordination alone is insufficient to eliminate flow imbalance. This finding suggests that capacity limitations at the bottleneck workstation remain the dominant factor restricting system performance.

Further analysis through constraint elevation shows that increasing bottleneck capacity by adding one permanent operator effectively removes the capacity constraint. The additional operator can be deployed through two alternative work allocation schemes, namely serial and parallel assignment. In serial assignment, the work elements are divided between the existing and additional operators, such that the total number of work elements is proportionally shared to balance individual workloads. In contrast, parallel assignment involves both operators performing the same set of work elements, while the number of processed components is evenly distributed between them to achieve workload balance. The post-improvement results indicate that all product demand can be fulfilled, system throughput increases significantly, and no bottlenecks remain, as evidenced by positive slack values across all workstations. These findings confirm that targeted capacity enhancement at the bottleneck workstation enables complete demand fulfillment and stabilizes the overall production flow.

D. Conlusion

This study demonstrates that the repeat order footwear production system at the 'Rumah Sepatu' SME experiences capacity imbalance, primarily due to the Upper Assembly workstation having the longest processing time among all workstations, thereby acting as the main bottleneck. The application of the TOC through its systematic stages, along with the proposed improvement in the form of adding one permanent operator, successfully increases production capacity, improves production flow, and enables the fulfillment of customer demand at '*Rumah Sepatu*'.

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