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Analysis of Building Permit Processing Delays Using Fishbone Diagram, 5 Why-Why Analysis, and 5W+1H Method

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ABSTRACT

***Objectives**: The objective of this study is to analyze the impact of implementing structured quality management tools, specifically the Fishbone Diagram, Why-Why Analysis, and 5W + 1H method, on reducing project permit processing delays in the construction industry, with a focus on improving efficiency at the transportation industry.*
***Methodology**: This study uses a qualitative research approach, collecting data through interviews, document analysis, and direct observations within the transportation industry. The Fishbone Diagram, Why-Why Analysis, and 5W + 1H method were systematically applied to identify the root causes of permit processing delays and take strategic steps so that permit delays do not occur again.*
***Finding**: The findings reveal that the application of these structured quality management tools significantly reduces permit processing delays by improving coordination between authorities to obtain approval for additional time, supported by clear progress reports and justifications for the causes of delays.*
***Conclusion**: The study concludes that the integration of the Fishbone Diagram, Why-Why Analysis, and 5W + 1H methods in the permit processing workflow effectively addresses operational inefficiencies. Future research should expand on these findings by applying these methods across different companies and regions to improve the management of Building Construction permits so that the Company avoids losses due to project cost overruns.*

***Keywords**: Building Permit; Quality Management Tools; Fishbone Diagram; Project Management.*

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INTRODUCTION

The building construction project was carried out by the transportation industry when the company opened a new branch office, and Building project licensing work includes the management of building permits (IMB), environmental permits, design approvals, land use permits, and coordination with relevant authorities to ensure regulatory compliance runs on time so that the project is not delayed (Nusraningrum et al., 2020). Each project has a set budget for the construction project and is under pressure to complete the project quickly so missing deadlines can affect the company's reputation and have legal consequences (Al-Hamrani et al., 2021). The execution of construction projects always takes into account the process, starting with the submission of land acquisition to determine if it meets the needs of the requesting team. The building construction projects that have been undertaken from 2018 to 2024 amount to 15 projects.

The building construction process is closely related to building permit documents, including the Building Approval Document (PBG) as regulated in Government Regulation No. 16 of 2021 concerning the Implementation of Law No. 28 of 2002 on Buildings (President of the Republic of Indonesia, 2021) and Law No. 11 of 2020 on Job Creation (Law of the Republic of Indonesia No. 11 of 2020 on Job Creation, 2020). PBG is a permit granted to building owners to construct new buildings and modify, expand, reduce, and/or maintain buildings under building technical standards as explained in Article 1 point 17 of Government Regulation No. 16 of 2021. The benefits of PBG include legal certainty regarding building ownership and minimizing accidents during building use, as the building is constructed according to technical standards and is aligned with environmental conditions. Article 253 of Government Regulation No. 16 of 2021 explains the process of obtaining PBG itself, where Article 253 paragraph (4) states that PBG must be applied for by the owner before construction begins. The process of obtaining building permits often experiences significant delays, causing delays in construction projects and negative impacts on urban planning and the local economy (Guinness & Heathcote, 2022). As well as a lack of understanding of the factors that cause these delays as well as limited analytical methods to identify the root cause of the problem can hinder effective remediation efforts in the licensing system.

The implementation of building construction projects in the transportation industry is often carried out in parallel with the processing of building approval permits. Fulfilling government regulations such as obtaining permits is a manifestation of good corporate governance because this builds a good company reputation in the public eye, increases investor confidence, and strengthens the company's competitive position in the long term (Hikmah et al., 2024). A strong government relationship and regulatory compliance are integral components of a successful corporate social responsibility strategy, which in turn enhances brand image (Madiawati & Pardede, 2023). This implementation directly improves the company's image and value, leading to higher employee performance and satisfaction (Dharma Putra & Nusraningrum, 2022; Karyatun et al., 2023). The brand or company image influences customer loyalty behavior attachment (Manggarani et al., 2021). Where the influence of a brand significantly impacts customer loyalty in product purchases (Septiaji et al., 2020). As a result, when the local government department conducts an inspection, construction may be halted due to the absence of permits. Carrying out construction without a PBG can result in the local government closing the project and imposing administrative sanctions. This research takes a sample from a project

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in Palembang, where the project began in August 2021, and the building permit processing has yet to be completed. The speed of project completion in a competitive market can be crucial for winning contracts and maintaining market share. Delays can result in competitors missing business opportunities. The limited time for building construction projects is critical to completing them quickly, on time, and according to the plan (Kumar et al., 2023; Lalmi et al., 2021; Moradi et al., 2020; Nusraningrum & Priyono, 2018).

Previous studies have identified various factors contributing to project delays, which include unavoidable force majeure, contract issues, and organizational systems or processes (Khotimah & Beatrix, 2022). Other causes include financial constraints, delays in material delivery, weather conditions, and decreased productivity (Lestari et al., 2022). Yunus highlighted that delays could also result from poor subcontractor selection and insufficient workforce skills (Yunus et al., 2022). Specifications, materials, human resources, and equipment also impact project delays (Putra Wijaya & Khamim, 2022), and can be caused by technical, financial, labor, and equipment-related factors (Maarif, 2022), and labor factors have a significant influence on project delays (Dharmayanti et al., 2022). Building Permit (IMB) process, such as the frequent surpassing of Standard Operating Procedures (SOP) timelines, leads to applicants not receiving the certainty they need regarding IMB completion (Rorong & Budiarso, 2021).

Although previous studies have addressed the issue of delays in the process of obtaining building permits, many of them have not thoroughly investigated the use of systematic analysis methods such as the Fishbone Diagram, the 5 Why-Why analysis, and the 5W+1H method concurrently to identify the root cause. The theoretical gap is manifested in the absence of integration between process management theory and quality analysis techniques in the context of building permits. Empirically, earlier research has frequently concentrated on specific case studies rather than broad generalizations, leaving gaps in our understanding of the causal elements that apply in different circumstances. Knowledge and evidence gaps are also visible due to the lack of integrated data and extensive examination of how various strategies can be. Therefore, this study needs to be carried out to analyze the delay in the building permit process by using a combination of Fishbone Diagram, 5 Why-Why Analysis, and 5W+1H methods simultaneously to identify the root cause of the problem thoroughly.

LITERATURE REVIEW

Project Management

Project management is an essential element when firms adopt technology, and factors such as leadership and communication are important for embedding sustainability in project management (Piyathanavong et al., 2024). Additionally, project management has been identified as one of the key resources for the Industry 4.0 transition (Bag et al., 2021; Nusraningrum, 2021). The importance of integrating sustainability into project management, supporting a company to achieve business strategy and stakeholder requirements. The embedment of sustainability into project management, through three main principles: environment, economy, and society, can enhance a company's competitive advantages and sustainable development (Chofreh et al., 2019; Imaningsih et al., 2022; Saratian et al., 2024). Project management can support the process of integrating sustainability into the business. Project management is highly suitable for a business environment that demands accounting skills, flexibility, innovation, speed, and continuous improvement (Amilia et al., 2022).

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Project Delay

Project delays occur due to various factors that complicate project management, such as the inability to accurately define goals and specifications (scope), poor planning, and unrealistic time and budget targets (Nusraningrum et al., 2020). Delays usually refer to ‘‘an unanticipated extension to the overall planned time and/or the incident which prolongs the duration of an activity which may affect the overall project duration”. Delays happen for numerous reasons and they are usually correlated which leads to even more complicated situations. Delay causes can vary according to the project’s location, type, size, and scope. Conducted various study cases in different countries and tracked many factors that caused delays in construction projects (Elhusseiny et al., 2021a). The consequences of delays in managing project resources include specific outcomes that are distinguished by functional and work relationships (Egwim et al., 2023; Elhusseiny et al., 2021b; Fashina et al., 2021; Wardana, 2021).

Building Construction

According to the Minister of Public Works Regulation No. 24/PRT/M/2008, a building is a structure that is erected or placed within an environment, either partially or entirely on, above, or within the ground and/or water, and serves as a place for humans to live, conduct business, engage in social-cultural activities, and other activities. Every building must meet the requirements of its primary function. The primary functions of buildings can be categorized into six groups: residential, religious, business, social-cultural, and special functions. Office buildings fall under the business function category (Presiden Republik Indonesia, 2008). A permit is an approval from the authorities based on the law, meaning that a person or entity cannot engage in certain activities unless permitted (Wahed & Ismail, 2022; Fauth et al., 2024; Noardo et al., 2022). This implies that certain actions are prohibited unless allowed by the government. Permits act as legal grounds, where specific activities cannot be conducted without the authorization of a government body. A permit is generally issued in writing after undergoing a series of processes within a specific timeframe (Abdel Wahed & Ismail, 2022; Fauth et al., 2024; Noardo et al., 2022). Without a permit, any activities related to the permit are deemed illegal and unlawful.

Fishbone, 5W + 1H

A fishbone diagram is a cause-and-effect tool that helps identify the reasons behind defects, variations, or failures in a process (Gartlehner et al., 2017). This diagram helps break down, in sequential layers, the root causes that may contribute to an effect (Trout, 2023).

The 5W1H method is an analytical approach used to understand and describe a problem or situation comprehensively (Erni & Wijaya, 2018; Keselamatan et al., 2017). It involves six questions to gather the necessary information for problem identification and solution development. The six questions are:

What: What is happening, or what is the problem?
Who: Who is involved in this situation or problem?
Where: Where is this problem occurring?
When: When did this problem happen, or when does it occur?
Why: Why is this problem occurring, or why is it important?
How: How is this problem occurring, or how can it be solved?

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The 5W1H method is valuable in decision-making, problem-solving, research, strategy development, and report writing. By answering these six questions, one can understand and create a clear picture of a problem or situation, leading to appropriate action (Rohmah, 2023).

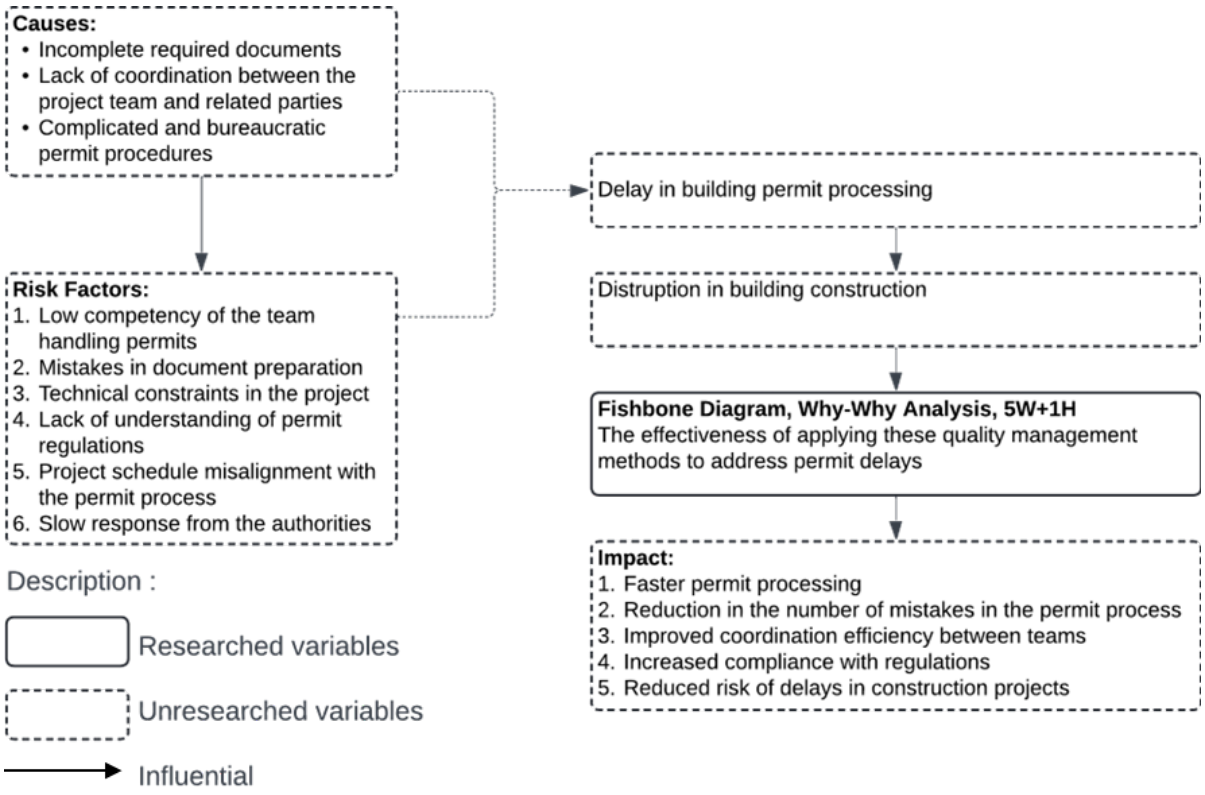

Figure 1. Conceptual Framework

METHOD

This study employs a descriptive qualitative method aimed at understanding and explaining a relevant issue using existing factual data. This approach is conducted systematically to provide an in-depth understanding of the issue at hand and to find the most appropriate solution or resolution based on that understanding. The research data is obtained through interviews and Focus Group Discussions (FGD) with the building construction project team, including the Facility Development Department Head, Project Manager, Facility Management Department Head, and Permit Specialists. The interview results are then analyzed using the fishbone diagram method, followed by why-why analysis, and finally, the 5W + 1H method to achieve accurate and effective improvement analysis.

RESULTS AND DISCUSSION

The research respondents interviewed were Facility Development Department Head, Project Manager, Facility Management Department Head, and Permit Specialists 4 people. Data from interviews and observations about the causes of delays on-site, a problem analysis was conducted on all relevant variables, including management systems, documentation, and

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manpower. Each variable had indicators or factors contributing to delays, which were analyzed using the 5M + 1E principle. Based on the analysis of the parties involved in the project, only 4Ms from the 5M + 1E principle were used, namely:

1). Man (Human/Employees/Manpower)
2). Method (Method/SOP)
3). Material (Required Documents)
4). Machine (Communication Tools)

These four factors were suspected to be the causes of delays in the permit processing and were analyzed by the author using a fishbone diagram, root cause analysis, and 5W + 1H analysis to identify the root causes and possible corrective actions. The fishbone diagram results are as follows.

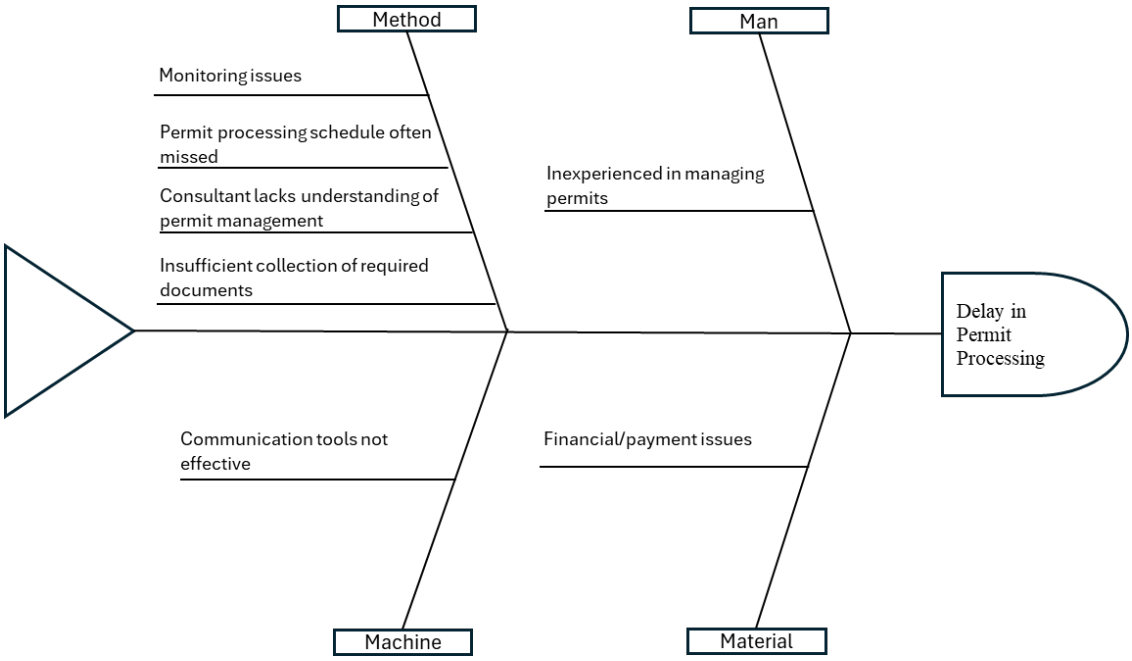

Figure 2. Fishbone Diagram Delays Processing Building Permits

From the four factors suspected to be the causes of project delays, as presented in the fishbone diagram above, the analysis of the sub-causes revealed the most significant factors influencing the permit processing:

1). Man: Lack of experience in handling permits.
2). Method: Inadequate collection of required documents, consultants lacking understanding of permit processing, frequent delays in permit processing schedules, and monitoring issues.
3). Material: Financial/payment issues.
4). Machine: Ineffective communication media.

These most significant sub-causes were further analyzed using the 5 Why Analysis, where the question "why" was asked five times to find the root causes of the problem. The results of the 5 Why Analysis are shown in Table 1.

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Table 1. The results of the 5 Why Analysis on the Factors Causing Delays in Processing Building Permits

Sub-Cause		*Why 1*	*Why 2*	*Why 3*	*Why 4*	*Why 5*
Man	Lack of experience in handling permits	Differences in regulations and environments across regions	PIC (Person in Charge) does not conduct sufficient research on the items being processed	Still relies on consultant information for permit processing details		
Method	Incomplete collection of required documents	Some required documents are not yet available	No checking is conducted	No method for document collection is in place		
	The permit consultant lacks an understanding of the process	No new strategy for communication regarding progress has been established	The consultant assessment process has not been identified	The permit consultant is the project contractor		
	Permit processing schedules are often delayed.	Differences in regulations and environments across regions	Still using the processing time standards from DKI Jakarta			
	Monitoring issues	Progress and challenges in permit processing are not documented	Monitoring is conducted only through phone calls or online meetings			
Material	Finance/payment issues	Documents are rejected or returned by the payment team	Payment documents are incomplete			
Machine	Communication media is ineffective	Progress information is difficult to obtain	Communication is only conducted through phone calls, chatting, and email	The consultant does not respond to phone calls, messages, or emails	The consultant is often offline	

Based on the 5 Why Analysis results above, the root causes of the delay in permit processing at THE TRANSPORTATION INDUSTY were identified, and categorized into four factors: man, method, material, and machine. The explanations of the root causes are as follows:

1). Man

The first factor suspected to cause delays in permit processing is the human factor, specifically the employees handling the permits. After conducting the 5 Why Analysis, it was found that some personnel lacked experience in permit processing. This lack of experience was due to their reliance on consultants for information about permit processing.

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2). Method
The second factor suspected to cause delays in permit processing is the method, including the SOP. The 5 Why Analysis revealed that there was no established method for document collection, which is evident from the frequent submission of incomplete documents during the application process to local authorities. Often, the consultant responsible for the project was also involved in the permit processing, leading to a lack of experience in the permit process. Additionally, the standard processing time used was based on Jakarta's procedures, which became problematic as Indonesia's decentralized governance means each region has its regulations, potentially differing from the central procedures. Monitoring was done via phone or online meetings, leading to issues since progress was often not documented due to the informal nature of these communications.

3). Material
The third factor suspected to cause delays in permit processing is the material factor, specifically the required documents for the permit. The analysis revealed financial issues, including delays in processing payments for some required documents during the application process. One of the causes of these delays was the lack of supplementary payment documents.

4). Machine
The fourth factor suspected to cause delays in permit processing is the machine factor, specifically the communication tools used to obtain information on project progress and consultant issues. The communication relied heavily on phone calls, chatting, and emails, which the consultants often did not respond to, indicating a lack of compliance.

Corrective actions for the permit processing delay issues in the building construction project in the transportation industry were analyzed using the 5W + 1H analysis. The root causes of the issues were identified through the 5 Why Analysis. The root causes of the permit processing delays were further analyzed using the 5W + 1H analysis for the four factors suspected of causing project delays: man, method, material, and machine. The goal was to formulate corrective actions that the company could take to reduce or eliminate the impact of these factors on permit processing delays. The 5W + 1H analysis results are presented in the following table.

Table 2. The Results of 5W + 1H Analysis to Determine Corrective Actions

No	Analysis Results 5W + 1 H			
1	***Man***			
	What	:	Problem	Lack of experience in handling permits
	When	:	Time of Occurrence	Palembang Project in 2021 - 2024
	Where	:	Location of Occurrence	the transportation industry
	Who	:	Responsible Party	CGASRHSSE Division
	Why	:	Cause of the Problem	Still relies on consultant information for permit processing details.
	How	:	Corrective Actions	1 Conduct in-depth research on the items to be processed at each location or region for the necessary documents.
				2 Seek training on the processing of permit documents.

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No	Analysis Results 5W + 1 H			
	Information	:	Corrective actions are recommended to management as a precaution for future permit processing projects.	
2	***Method***			
	What	:	Problem	Incomplete collection of required documents
	When	:	Time of Occurrence	Palembang Project in 2021 - 2024
	Where	:	Location of Occurrence	the transportation industry
	Who	:	Responsible Party	CGASRHSSE Division
	Why	:	Cause of the Problem	No method for document collection is in place.
	How	:	Corrective Actions	Create standardized requirement documents before processing permits in each region.
	Information	:	Corrective actions are recommended to management as a precaution for future permit processing projects.	
	What	:	Problem	The permit consultant lacks an understanding of the process.
	When	:	Time of Occurrence	Palembang Project in 2021 - 2024
	Where	:	Location of Occurrence	the transportation industry
	Who	:	Responsible Party	CGASRHSSE Division
	Why	:	Cause of the Problem	The permit consultant is the project contractor.
	How	:	Corrective Actions	Develop a checklist for identifying the appropriate licensing vendors.
	Information	:	Corrective actions are recommended to management as a precaution for future permit processing projects.	
	What	:	Problem	Permit processing schedules are often delayed.
	When	:	Time of Occurrence	Palembang Project in 2021 - 2024
	Where	:	Location of Occurrence	the transportation industry
	Who	:	Responsible Party	CGASRHSSE Division
	Why	:	Cause of the Problem	Still using the processing time standards from DKI Jakarta.
	How	:	Corrective Actions	1 Conduct research across all regions on the time required for processing permits. 2 Create a checklist for estimating the processing time of permit documents.
	Information	:	Corrective actions are recommended to management as a precaution for future permit processing projects.	
	What	:	Problem	Monitoring issues
	When	:	Time of Occurrence	Palembang Project in 2021 - 2024
	Where	:	Location of Occurrence	the transportation industry
	Who	:	Responsible Party	CGASRHSSE Division
	Why	:	Cause of the Problem	Monitoring is conducted only through phone calls or online meetings.
	How	:	Corrective Actions	1 Develop a regular schedule for updating work progress (PDCA). 2 Create a systematic list or format for updating permit processing.

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No	Analysis Results 5W + 1 H			
				3 Improve the contractual agreement between the owner and the consultant for fulfilling obligations and impose strict sanctions for any violations.
	Information	:	Corrective actions are recommended to management as a precaution for future permit processing projects.	
3	***Material***			
	What	:	Problem	Finance/payment issues
	When	:	Time of Occurrence	Palembang Project in 2021 - 2024
	Where	:	Location of Occurrence	the transportation industry
	Who	:	Responsible Party	CGASRHSSE Division
	Why	:	Cause of the Problem	Payment documents are incomplete.
	How	:	Corrective Actions	Create a list of required payment documents before submission to the finance team.
	Information	:	Corrective actions are recommended to management as a precaution for future permit processing projects.	
4	***Machine***			
	What	:	Problem	Communication media is ineffective.
	When	:	Time of Occurrence	Palembang Project in 2021 - 2024
	Where	:	Location of Occurrence	the transportation industry
	Who	:	Responsible Party	CGASRHSSE Division
	Why	:	Cause of the Problem	The consultant is often offline.
	How	:	Corrective Actions	Improve the contractual agreement between the owner and the consultant for fulfilling obligations and impose strict sanctions for any violations.
	Information	:	Corrective actions are recommended to management as a precaution for future permit processing projects.	

Discussion

The analysis results from the fishbone diagram, which was then further analyzed using the why-why analysis method, followed by a breakdown and analysis using the 5W + 1H method, revealed several issues causing delays in permit processing. These issues include the following:

1). Man (Human Factor): The permit PIC still relies on consultants for information on permit processing.
2). Method: The work process lacks a document collection method; the permit consultant is the project contractor; the processing time standards from Jakarta are still being used; and monitoring is conducted only by phone or online meetings.
3). Material: Payment documents are incomplete.
4). Machine: The consultant is often offline.

The Proposed improvements from these issues, the researcher suggests the following improvements:

1). Man (Human Factor): Conduct in-depth research on the items that need to be processed at each location or region and seek training on building permit processing.
2). Method: Establish standard documentation requirements before permit processing in each region, create an identification checklist to select the appropriate permit consultant, conduct research across all regions on building permit processing times, create an

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estimated permit processing document list, schedule routine progress updates (PDCA), develop a systematic permit processing update format, and improve the cooperation agreement between the owner and the consultant, including imposing strict sanctions for violations.

3). Material: Create a payment document requirement list before submission to the finance team and improve the cooperation agreement between the owner and the consultant, including imposing strict sanctions for violations.
4). Machine: Improve the cooperation agreement between the owner and the consultant, including imposing strict sanctions for violations.

CONCLUSION

This study shows that there is a theoretical and empirical gap in terms of the integration of process management theory with quality analysis techniques, as well as the lack of integrated data to comprehensively understand the causes of delays. Therefore, this study offers a new approach by combining various analysis methods in one research framework to solve problems using fishbone diagrams, why-why analysis, and 5W + 1H. This research provides a theoretical contribution to the study of quality management and sustainable development. The application of the fishbone diagram, why-why analysis, and 5W + 1H methods not only from operational inefficiencies but also aligns with broader sustainable development goals by streamlining processes that are often hindered by bureaucratic delays. This integration is crucial to ensuring that development projects are completed on time, thereby supporting the economic and environmental objectives of sustainable construction. Practically, this study contributes to project management practices, particularly in the construction sector. The findings show that by systematically identifying and addressing the root causes of permit delays, companies can significantly improve project timelines. This has direct implications for project managers and construction companies in Indonesia, demonstrating that adopting quality management tools like the fishbone diagram, why-why analysis, and 5W + 1H methods can result in more predictable and manageable project outcomes. Furthermore, this research emphasizes the importance of a proactive approach to addressing permit-related challenges. By using structured methods to analyze and solve problems, companies can anticipate potential delays and implement corrective actions before they escalate into major issues. This approach not only improves the efficiency of the permitting process but also enhances overall performance in project delivery.

However, this study has limitations that need to be acknowledged. The research was limited to a single company, the transportation industry, and may not fully reflect the diversity of challenges faced by other companies in the construction industry. Future research could expand the scope by including multiple companies in various regions to validate these findings and explore the generalization of the fishbone diagram, why-why analysis, and 5W + 1H methods. Additionally, this research used a cross-sectional approach, which may limit the understanding of long-term impacts. Future studies could use a longitudinal approach to observe the ongoing effects of the fishbone diagram, why-why analysis, and 5W + 1H methods on project permit processing over time. Finally, while this research focused on the permitting process, other factors such as regulatory changes and stakeholder involvement could also affect project timelines and should be explored in future research. From these limitations and building on the findings from this research, future studies can further enhance the knowledge on improving

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building development with attention to building permits through effective quality management practices.

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