Stakeholder Identification and Power-Interest Analysis in the Development of Safety Audit Policy on High-Rise Building Projects with Design-Build Contracts

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Abstract: The rapid growth of construction project development in Indonesia has made high-rise buildings the main solution in development plans in Indonesia. Similarly, the National Capital City (IKN) which is moved to East Kalimantan Province by the Government consists of high-rise buildings and will use the design-build contract method to shorten the project implementation time. In its development, construction safety is a crucial aspect that must be managed properly to reduce the risk of accidents that can cause huge losses, both material and life. This research identifies the various stakeholders involved in high-rise building projects and analyzes their roles, duties and responsibilities. Power and interest analysis was conducted to understand the influence of each stakeholder in the construction safety audit process.

This research provides important information in understanding stakeholder dynamics in the policy and institutional development of the construction safety audit process. The findings are expected to serve as a reference for construction practitioners and policy makers to create a safer and more effective working environment, and improve safety standards in high-rise building projects.

Keywords: Construction Safety, Audit Process, Stakeholder Analysis, Policy, Institutionalization, High-rise Building Project, Design-Build Contract

I. Introduction

The development of high-rise buildings in Indonesia continues to increase every year. Based on data from The Council on Tall Buildings and Urban Habitat (CTBUH), Indonesia is eighth on the list of countries with the most skyscrapers in the world as of August 2022, with 129 buildings over 150 meters high and 48 buildings over 200 meters high. Ongoing construction in the Capital City of the Archipelago (IKN) is also adding to the number of high-rise buildings in Indonesia.

With increasing development, work safety issues are also becoming increasingly important. Data from BPJS Ketenagakerjaan shows that cases of work accidents continue to increase from 123,000 cases in 2017 to 265,334 cases in 2022, with the construction sector as the largest contributor. These workplace accidents are often caused by management negligence and lack of implementation of effective safety systems.

The design and build contracts used on these projects allow for faster and more efficient construction execution, but also require strict safety supervision and audits. PUPR Ministerial Regulation No. 10 of 2021 on Guidelines for Construction Safety Management Systems emphasizes the importance of safety audits to ensure compliance with safety standards and to identify and correct existing deficiencies. PUPR Ministerial Regulation No. 10 of 2021 also mentions the stakeholders involved in the project work process who are involved to support the success of construction safety performance. Analyzing the power and interest of each stakeholder will certainly help in understanding their influence on the audit process and safety policy implementation. By actively involving all stakeholders and coordinating their roles, it is

expected that construction safety performance can be improved.

II. Research objectives

This research is expected to provide benefits and added value for:

1. The author, as an increase in knowledge of the institutional structure of the high-rise building audit process in the implementation of design and build contracts as one of the requirements for obtaining a master's degree.
2. Institutions, as an additional theory about the institutional development of the high-rise building audit process in the implementation of design and build contracts so that it can run effectively and efficiently in accordance with the audit objectives.
3. Academics, as input in the development of project management science, especially related to construction safety audits in the implementation of design and build contracts in high-rise buildings and can be used for further research.
4. Ministry, input to the PUPR ministry on the roles, duties and responsibilities of the Construction Safety Committee

III. Literature review

3.1 Stakeholders

Stakeholders are individuals or groups that can influence or be influenced by the goals of an organization or project (Freeman, 1984). Stakeholders are parties who are actively involved in an organization or project, so that the performance of the organization can affect them (PMI, 2017). So, it can be concluded that stakeholders are individuals or groups that can affect or be affected by the goals and performance of the organization, and determine the success of the organization.

Stakeholder analysis (SA) is often considered a valuable approach to use in: i) recognizing conflicts that may arise between different stakeholders when exploring complex issues such as sustainable energy development; ii) understanding the position and complexity of relationships between stakeholders in the system with regard to decision-making; and iii) gaining a comprehensive understanding of relevant stakeholders, their needs and objectives. SA provides an excellent basis for developing decision support tools (Grimble, 1998), as it successfully identifies key stakeholders as well as their interrelationships, influences, and objectives in relation to decision-making (Aly et al., 2019). Over the past decades, SA has attracted growing attention among researchers from various fields, including renewable energy technologies (Ahsan et al., 2018) (Reed et al., 2009).

According to the sixth edition of the PMBOK published in 2017, stakeholder management consists of four stages: Identify Stakeholders, Plan Stakeholder Engagement, Manage Stakeholder Engagement, and Monitor Stakeholder Engagement.

3.2 Stakeholder Dimensions

3.2.1 Stakeholder Identification

Stakeholder identification is a process conducted periodically to identify project stakeholders, and analyze and document relevant information about their interests, involvement, interdependencies, influence, and potential impact on project success. A key benefit of this process is that it enables the project team to determine the appropriate focus of engagement for each stakeholder or stakeholder group. Stakeholder identification is also a process to determine the parties who are internal, external, primary, and secondary stakeholders (W. Wang, Liu, & Mingers, 2015). This process is carried out periodically throughout the project as needed. The inputs, tools and techniques, and outputs of this process are depicted as shown in Figure 1 below:

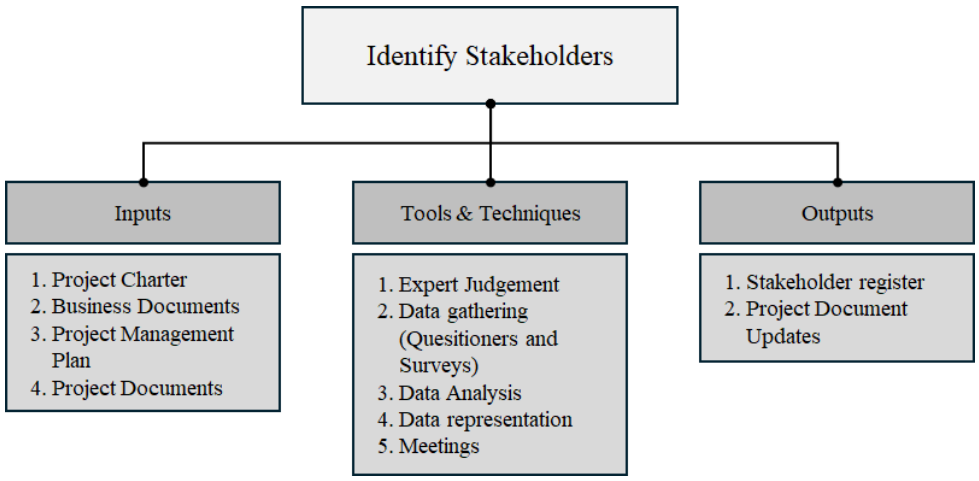

Fig.1.IdentifyStakeholders (PMBOK 6th Edition, 2017)

The stakeholder identification process is carried out by studying the organizational structure, organizational goals, and key activities of the organization (W. Wang, Liu, & Mingers, 2015). The method that can be used to identify stakeholders is a process to determine the parties involved in managing the organization into internal and external stakeholders. This process can be done through group discussions, brainstorming, snowball sampling, self-identification, experience-based methods, and intuition which can then be validated using the Delphi Method by experts.

3.2.2 Stakeholder Mapping

The purpose of stakeholder mapping is to assist managers in engaging stakeholders to achieve organizational goals (Wakka, 2014). Considerations used in stakeholder mapping include (Noto & Noto, 2019):

a. Power to influence organizational structure
b. Legitimacy of the relationship with the organization
c. Urgency of stakeholder claims

Stakeholder mapping can be done using the "Power-Interest Grid", which classifies stakeholders into four categories: keep satisfied, manage closely, monitor (minimum effort), and keep informed (Yufrizal, 2022).

3.3 Power Interest

According to the Project Management Institute (2017), the power - interest grid technique is a grouping of stakeholders based on their level of power, level of concern for the project outcome, ability to influence the project outcome, or their ability to cause changes to the project. This classification model is particularly useful for projects that have simple relationships between stakeholders.

Based on the strength and importance matrix, there are four stakeholder classifications: keep satisfied, manage closely, monitor (minimum effort), and keep informed (PMI, 2017).

- Keep satisfied, are stakeholders who are in the quadrant with a high level of influence and low importance. This group only needs to receive information to stay satisfied. Despite their low level of importance, they need to be involved because they have the power to make important decisions (Rahma, Herdiyanti, &Astuti, 2017; Thompson, 2012).
- Manage closely, are stakeholders who are in the quadrant with a high level of influence and importance. This group must be managed well because their support is needed and they are involved in activities that result in important decisions (Rahma et al., 2017).
- Monitor (minimum effort), is a stakeholder in the quadrant with a low level of importance and influence. This group has the lowest involvement compared to other stakeholder groups. They only need to be monitored and communication with them does not need to be excessive so that they do not feel bored (Rahma et al., 2017; Thompson, 2012).
- Keep informed, is a stakeholder who is in a quadrant with a low level of influence and high importance. This group should always be

provided with information related to project development and can be a place to consult to get important input (Rahma et al., 2017; Thompson, 2012).

3.4 High-rise Building with Design-Build Contract

A building is a physical structure resulting from construction work that is integrated with its location, either partially or fully above and/or in the ground and/or water, which serves as a place for humans to carry out their various activities, such as housing, religious activities, business, social, cultural, and special activities. This is regulated in the Government Regulation on the Implementation Regulation of Law No. 28 Year 2000 on Building. According to the civil building design code in China, buildings are classified into six types: low-rise, mid-rise, small-rise, high-rise, and very high-rise, where small-rise and high-rise buildings are described as "high-rise buildings" with a height of 300-100 meters (Wang, 2019). The regulation of design-build in Indonesia is regulated in the latest regulation, namely the Minister of PUPR Regulation No. 25 of 2020 concerning Amendments to the Minister of Public Works and Public Housing Regulation No. 1 of 2020 concerning Standards and Guidelines for Procurement of Design-Build Integrated Construction Works through Providers. The design-build method is an alternative where the design and construction phases can be carried out simultaneously. In this method, the contractor is responsible for providing both design and construction services, allowing the start of construction before the design is completed (Park & Kwak, 2017). In a design-build contract, the use of a fast-track system allows time cuts for the service provider (contractor) as it does not need to go through the process of selecting planning consultant services separately (Putro&Latief, 2020).

3.5 Audit Process Policy Based on PermenPUPR No.10 year 2021

PermenPUPR No. 10 year 2021 defines Audit as an effort to find discrepancies in the system to measure the effectiveness of the implementation of the management system, including through internal audits. Internal audits are conducted and determined periodically by the Construction Work Implementer by involving independent auditors. Internal audits are carried out at least 1 time in 1 Construction Work Implementation and / or for multi- year construction work following applicable laws and regulations.

Based on PermenPUPR No. 10 Year 2021, each Construction Safety Plan (RKK) contains elements of the Construction Safety Management System consisting of;

1. Leadership and workforce participation in Construction Safety:
2. Construction Safety planning;
3. Construction Safety support;
4. Construction Safety operations; and
5. Lerformance evaluation of Construction Safety Management Systemimplementation.

Based on the description in PermenPUPR No. 10 of 2021, theaudit broadly consists of the stages of planning and preparing a team, conducting an audit by collecting evidence in the field according to procedures, evaluating the audit results and preparing an accountability report on the audit that has been carried out. So that to get optimal audit results, good process strategy planning is needed from start to finish.

3.6 Construction Safety Performance

Construction safety covers all technical activities that support construction work to ensure the fulfillment of Security, Safety, Health, and Sustainability Standards. It aims to ensure construction engineering safety, labor safety and health, community safety, and environmental safety. Construction Safety Analysis (CSA) is a method to identify and control hazards based on a series of works in a work method statement, in accordance with the Minister of Public Works and Public Housing Regulation No. 10 of 2021.

Work accidents that occur during the construction execution stage are influenced by the design and planning stages (Gambatese, Behm, & Rajendran, 2008; Yuan et al, 2019). Ineffective risk assessment of potential hazards can lead to construction accidents, delays, increased costs, and disputes between parties (Khalid et al, 2021).

In accordance with the provisions in Permen PUPR No. 10 of 2021, to achieve safety performance, both users and service providers are required to implement a risk management process at the design

and construction stages of the project. This aims to reduce and even eliminate construction accidents, which is one of the safety performance indicators.

IV. Methodology

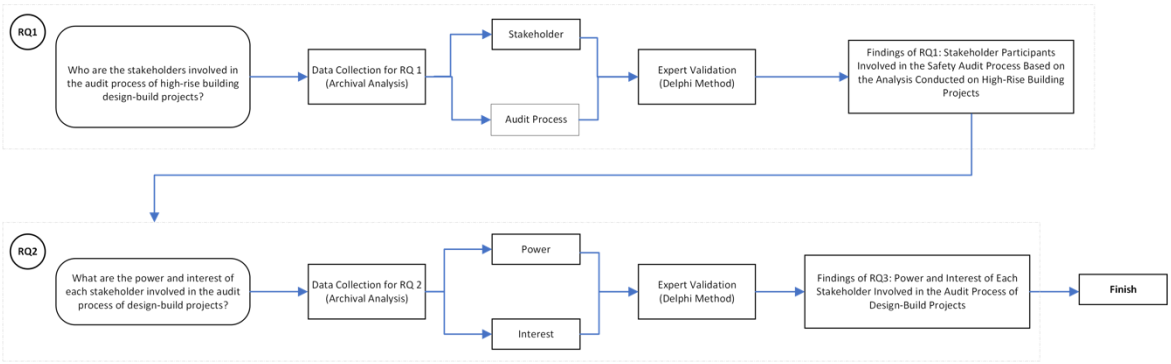

Fig. 2. The Reseach Flow

The first step of this research involved archival analysis to identify the initial stakeholders involved in the construction safety audit process and then classify them into 2 categories, namely Internal Stakeholders and External Stakeholders. Dimensions and indicators were taken from the literature study and Permen PUPR No. 10 of 2021, then expert validation with the Delphi method involved a process of interaction between researchers and selected experts based on their expertise on a particular topic, using a questionnaire as a research instrument (Yousuf, 2007).

The next step is to evaluate each stakeholder to identify their level of power and interest. The power and interest analysis in this study was conducted using the Delphi method with construction safety experts.

4.1 Data Collection

Data was collected through an online questionnaire sent to five experts in the field of construction safety. The purpose of this data collection was to validate the research variables , eliminate irrelevant variables, and add necessary variables with proper justification. The experts involved in this study have at least 10 years of experience in the field of construction safety.

Referring to Figure 2, data collection was conducted in three stages. First, a questionnaire was used to validate the identification of stakeholders involved in the construction safety audit process, and categorize them into internal and external stakeholders. Second, after the stakeholders were identified based on their classification, the power and interest of each stakeholder was assessed and mapped in a power-interest matrix.

4.2 Data Analysis

4.2.1 Step 1 (Stakeholder Identification and Classification)

After collecting data from previous research and Permen PUPR No.10 of 2021, 32 stakeholders involved in the construction safety performance audit process were identified, as follows:

Table1 Preliminary List of Construction Safety Audit Process Stakeholders

No.	*InitialStakholder*
1	Director General of Construction
2	Head of Sub Directorate of Construction Security and Safety
3	Member / Construction Safety Expert
4	Team of Experts
5	Safety Committee Secretariat
6	Activity Implementation Work Unit
7	Commitment Maker Official (PPK)
8	Construction Services Supervisory Unit
9	Planner and Designer Consultant
10	Supervision/Supervision Consultant
11	Main Contractor
12	Sub Contractor

No.	*InitialStakholder*	*No.*	*InitialStakholder*
13	Provincial Government	*15*	Law Enforcement Apparatus
14	District/City Level Local Government	*16*	Communities Surrounding the Project

After obtaining the list of stakeholders, the authors then identified these stakeholders based on two classifications: internal stakeholders and external stakeholders. The results were then validated by experts with the identification results shown in the following table:

Table 2. Stakeholder Identification

No.	*Internal Stakeholders*	*External Stakeholders*
1	Director General of Construction	Planner and Designer Consultant
2	Head of Sub Directorate of Construction Security and Safety	Supervision/Supervision Consultant
3	Member / Construction Safety Expert	Main Contractor
4	Team of Experts	Sub Contractor
5	Safety Committee Secretariat	Provincial Government
6	Activity Implementation Work Unit	District/City Level Local Government
7	Commitment Maker Official (PPK)	Law Enforcement Apparatus
8	Construction Services Supervisory Unit	Communities Surrounding the Project
9		Director General of Construction
10		Head of Sub Directorate of Construction Security and Safety
11		Member / Construction Safety Expert

4.2.3 Step-Two (StakeholderMapping - Power andInterest Matrix)

Stakeholder input will be rated using a Likert scale that ranges from 1 to 5, with options of 'very low', 'low', 'neutral', 'high', and 'very high'. The experts' evaluations will then be categorized based on their role, classified according to Ackermann & Eden's (2011) categorization of 'player', 'subject', 'crowd', and 'context determinant'. Five experts with a minimum of ten years' experience in Construction Safety were involved in this study. The results of the experts' evaluation are presented in the table below.

Table 3. Resultassessmentof Power andInterest

No.	*Stakeholders*	*Power*	*Interest*	*Clasification*
1	Director General of Construction	*5*	*5*	*Manage Closely*
2	Head of Sub Directorate of Construction Security and Safety	*5*	*5*	*Manage Closely*
3	Member / Construction Safety Expert	*5*	*5*	*Manage Closely*
4	Team of Experts	*5*	*5*	*Manage Closely*
5	Safety Committee Secretariat	*5*	*5*	*Manage Closely*

No.	*Stakeholders*	*Power*	*Interest*	*Clasification*
6	Activity Implementation Work Unit	*5*	*5*	*Manage Closely*
7	Commitment Maker Official (PPK)	*5*	*5*	*Manage Closely*
8	Construction Services Supervisory Unit	*5*	*5*	*Manage Closely*
9	Planner and Designer Consultant	*4*	*4*	*Manage Closely*
10	Supervision/Supervision Consultant	*4*	*4*	*Manage Closely*
11	Main Contractor	*4*	*4*	*Manage Closely*
12	Sub Contractor	*3*	*3*	*Monitor*
13	Provincial Government	*4*	*3*	*Keep Statisfied*
14	District/City Level Local Government	*4*	*3*	*Keep Statisfied*
15	Law Enforcement Apparatus	*3*	*3*	*Monitor*
16	Communities Surrounding the Project	*3*	*2*	*Monitor*

After obtaining the power and interest values of each stakeholder, the next step is to create a power and interest matrix. The power and interest matrix of each stakeholder in the construction safety agency can be seen in the following figure:

Power	High (4-5)	Provincial Level Local Government Regency / City Level Local Government	Director General of Bina Konstruksi Head of Subdirectorate of Construction Safety and Security Member / Construction Safety Expert Expert Team Secretariat Safety Committee Work Unit Implementing Activities Commitment Making Officer (PPK) Construction Services Supervisory Unit Planner and Designer Consultant Supervision/Supervision Consultant Main Contractor
	Low (1-3)	Subcontractors Law Enforcement Officials (APH) Communities Surrounding the Project	
		Low (1-3)	High (4-5)
		Interest	

Fig. 2. Power Interest Matrix

V. Result and Discussion

Identifying the key stakeholders relevant to the construction safety audit process in Indonesia is an important prerequisite for providing recommendations for future national policies. In this analysis, the various key stakeholders that contribute to the policy development of their construction safety audit process have been identified based on their respective power and interest.

The results revealed that Indonesia's construction safety audit process has a variety of key stakeholders that have high influence and importance. Stakeholder groups that fall into the "Manage Closely" group are recognized as having the highest level of importance in the decision-making process. Therefore, they are characterized as the institutions with the highest influence on decisions affecting the policy development of the construction safety audit process in Indonesia.

While the Stakeholder Group that is included in the "Keep Statisfied" group is a stakeholder who enters the quadrant of high influence and low importance. This group only receives information so that they remain satisfied. This stakeholder group still needs to be involved even though their level of interest is low, because they have the power to make decisions in determining the development of the construction safety audit process policy.

The last stakeholder group is the "Monitor" group, which is a stakeholder with a low level of importance and influence. This stakeholder group only needs to be monitored and communicated well in the construction safety audit process.

VI. Conclusion

Based on the results of the research that has been carried out, in the development of policies on the construction safety audit process, stakeholders involved with their respective powers and interests have been identified. The number of stakeholders involved is 16 stakeholders with a classification of 8 internal stakeholders and 8 external stakeholders. Of the stakeholders that have been identified, it is found that there are 11 stakeholders who fall into the "Manage Closely" category which has the highest level of importance in the decision-making process that affects the development of the construction safety audit process policy in Indonesia, 2 stakeholders who fall into the "Keep Statisfied" category who only receive information so that they remain satisfied but still need to be involved even though the level of importance is relatively low, because they have the power in decision making in determining the development of the construction safety audit process policy. Finally, there are 2 stakeholders who fall into the "Monitor" category which are stakeholders who onlyneed to be monitored and have good communication in the construction safety audit process.

Acknowledgments

This research has been supported by the Project Management Program, Civil Engineering University of Indonesia to provide support in completing this research.

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