



Development of Risk-Based Audit Method Standard for Stadium Project Using Design and Build Contract to Minimize Dispute: Owner's Perspective

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Abstract. Design and build contracts are contracts that are currently being widely used in government projects. Stadium project work is one type of project that uses design and build. However, in the implementation of design and build projects, many disputes often occur. This dispute occurs because there are many different points of view during the post-project audit phase between the Project Owner and the contractor as a provider of construction services. The purpose of this study is to identify audit activities standards within the Ministry of Public Works and Public Housing, analyzing the dominant risk factors that cause dispute in design and building projects, the results of this study are expected to become a standard risk-based method for auditing in Design and Build Contracts.

Keywords: Design and Build · Audit · Dispute · Risk Analysis · Stadium Building

1 Introduction

In achieving economic growth targets through National Strategic Projects the government uses Design and Build (DB) contracts which are considered capable of responding to the challenges of accelerating project completion. However, in practice there were many disputes between the Ministry of PUPR as the Project Owner and the contractor as the construction service provider during the post-project audit stage. This happened in the 2018 XVIII Asian Games preparation project, where the Audit Board of the Republic of Indonesia claimed that 24% of the total contract value (TCV) was miscalculated while only 5% of the findings were confirmed as true by the contractor. The aims of this research are (1) to identify audit processes and activities in stadium construction projects for design and build contracts (2) to identify the risks to obtain the dominant risks that occur in each audit activity can be identified. (3) Develop a stadium construction audit process based on dominant risk factors and risk mitigation to reduce disputes in DB type contracts.

2 Literature Review

2.1 Ministry of Public Works and Public Housing Audit Process

According to (Agoes, 2017) Audit is an examination that is carried out critically and systematically by independent party, to the financial statements that have been compiled by management, along with accounting records and supporting evidence, with the aim of being able to provide opinion on the fairness of the financial statements. Audits must be carried out by institutions or people who are competent and independent, because the results of an audit of the financial statements of the auditor will be used by users of financial statements to make economic decisions. This means the auditor has an important role in validating financial statements of a company or agency. Therefore, audit quality is an important thing that must be considered by the auditor in the audit process. The possibility of finding abuse of the system depends on the auditor's own abilities such as professional attitude, audit structure, career path, and education that has been taken. In accordance with the PAN ministry regulation Number 9 of 2009 concerning General Guidelines Implementation, Monitoring, Evaluation, and Reporting of Follow-up Results Functional Supervision, broadly regulates (1) Obligations of agency leaders to carry out follow-up on the results of supervision functional towards government agencies, both carried out by the Agency Financial Auditor (BPK) and Government Internal Supervisory Apparatus (APIP), (2) Findings of monitoring results that are difficult or cannot be followed up and have logical causes based on the evaluation of cases and conditions, or have the implementation of the follow-up by the auditee sought, it can be removed from monitoring findings. BPK has the authority to examine the management and responsibilities of state finances freely and independently according to Law No.15/2006. There are three types of BPK audits, i.e. financial audits, performance audits, and audits with a specific purpose. The audit regulation that is used as a reference in this research is BPK's 2013 R&D Inspection with Specific Purposes regarding inspection guidelines for procurement of goods and services, however audit activities specified in this guideline are not for DB type of contract.

2.2 Project Risk Analysis

PMBOK (2017) states that risk analysis is a search process information/description more specific to the risks that have been identified include quantification of risk in terms of probabilities, causes of occurrence and relatedness of risks. While estimating the impact of risk investigates the potential effects affect the quality of construction such as time, price and quality of work. According to Godfrey (1996) systematically processed risk analysis can help to Clearly identify assess or rank risks, Focusing on major risks (Major Risks), Clarify the limits of losses and control aspects of uncertainty, Minimizing the potential for damage in the worst case scenario, Clarify/affirm each role involved in risk management. The risk level index stated in the appropriate risk level matrix with the criteria of Australian / New Zealand Standard 'Risk Management' can be shown in the following Fig. 1.

F x I		Frequency				
		1	2	3	4	5
Impact	5 Very High	5	10	15	20	25
	4 High	4	8	12	16	20
	3 Medium	3	6	9	12	15
	2 Low	2	4	6	8	10
	1 Very Low	1	2	3	4	5

Fig. 1. Risk Level Matrix

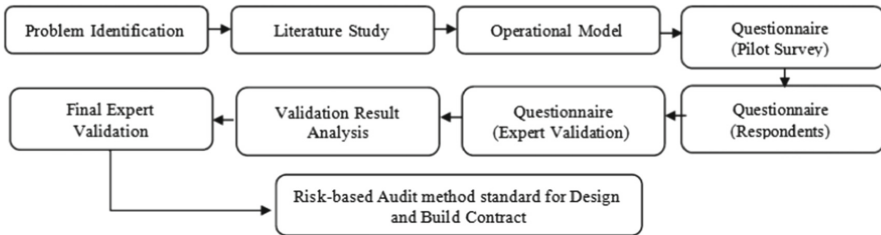


Fig. 2. Research Flow Diagram

2.3 Dispute

In some literatures dispute can be interpreted as a conflict, an event when the same situation is seen differently by two parties and also conflict can be defined as different goals and attitudes by different parties (Naji K. K., Mansour, & Gunduz, 2020). Dispute can occur in construction between parties in a contract (Perdana, 2017). Dispute in construction can be divided into 4 categories (Suyoga & Yohanes 2020) related to time (progress delay), finance (claim and payment), work standard (design and work results), and conflict relationships in the construction industry.

2.4 Methods

The methodology carried out for this research included study literature, analytical, validity, reliability, and descriptive-analytical tests, through four steps of data collection (1) study literature (2) Focus Group Discussion with expert from Ministry of Public Works and Public Housing auditor (3) pilot survey, (4) questionnaire, (4) expert validation, and (5) final expert validation. Furthermore, the data analysis was conducted using SPSS 25 software Fig. 2.

3 Results and Discussion

3.1 Ministry of Public Works and Public Housing Audit Process and Activities

Literature study related to the audit process and activities for the stadium project was conducted and a forum group interview has been done, using a questionnaire as an

Table 1. Audit Process in Ministry of Public Works and Public Housing

I.	Inspection Procedures in Planning
1	Identification of Needs
2	Preparation and Determination of Budgeting Plan
3	General Policy Determination – Work package
4	General Policy Determination – Procurement Method
5	General Policy Determination – Procurement Organization
6	Preparation of Term of Reference
7	Announcement of General Procurement Plan (RUP)
II	Audit Contract Selection Procedure
8	General Procurement Plan
9	Review of general procurement plan
10	Preparation and determination of procurement implementation plan
11	Selection of procurement system
III	Contract Execution Inspection Procedure
12	Contract Documents
13	Implementation Preparation
14	Implementation of Field Work
15	Quality Control
16	Control of quantity/volume of work
17	Monitoring execution schedule of work
18	Time extension
19	Addendum
20	Suspension and termination of contract
21	Late charge
22	Adjustment for Changes in Cost
23	Guarantee
IV	Work Handover Inspection Procedure and Maintenance Period
24	First Handover
25	Inspection of Construction Work Results
26	Timely completion of work packages
27	Maintenance period
28	Second Handover

instrument used to obtain expert validation afterwards, the analysis is carried out so that the audit process and activities for DB is obtained. The result is that there are 88 audit activities from 28 process which are included into 4 phases as shown in the Table 1.

3.2 Risk Factors and Dominant Factors

The risk categories and dominant risk factors that occur in each activity is gathered from literature study there are 88 risk factors on the DB audit process and activities referring to (Faisal, 2019), (Alam, 2011), and (Simanjuntak & Sudibyo 2020) then the questionnaire was sent to 39 respondents after having validation process on the variables and pilot survey were done. The way to determine this priority order is by giving weight to each of the frequency and impact criteria. Then the average result on the frequency weighting value is multiplied by the average result on the impact weighting value to determine the level of risk Table 2. Following is the summary of the high-risk results:

Table 2. High Risk Category Based on Respondent

Risk Category	Risk Code	Risk Details
XI. Owner Management Ability	X1.1	Unrealistic project schedule by owner
	X1.2	Availability of owner personnel to handle Design and Build work
	X1.3	Owner’s planning experience in making Design and Build Terms of Reference (TOR)
	X1.4	Owner’s understanding in determining the duration of the Design and Build work
	X1.5	The owner’s ability to evaluate the results of the development design submitted by the Contractor
	X1.6	work sequence planning that is not well structured
	X1.7	Owner’s desire to provide input on the work design
	X1.8	The quality of the owner’s communication with the design team when developing the design
	X1.9	Availability of experts, Construction Management consultants, to assist the owner during the implementation of DB work
	X1.10	Owner’s desire to make changes during implementation

(continued)

Table 2. (continued)

Risk Category	Risk Code	Risk Details
	X1.11	The owner's understanding in calculating the budget for design and build work. Due to unrealistic prices
	X1.12	Owner's limited budget
	X1.13	Limited authority of the personnel owner in decision making
	X1.14	Experts with appropriate educational background
	X1.15	Regulations that apply to project success
	X1.16	Good managerial organization for project success
	X1.18	The owner sided with/leads to a particular group/executor/company
X2. Procurement Process	X2.1	Availability of experienced Design and Build companies
	X2.2	Incomplete technical assessment criteria in assessing the qualifications of bidders
	X2.3	Delays in the process of making contract documents
	X2.6	Negotiation process not consider reasonable offer price
	X2.7	Delay in the tender process
	X2.13	Field explanation wasn't carried out by owner
X3. Planning Skills	X3.1	Design team experience in making design
	X3.2	The design team's understanding of the design needs requested by owner in line with TOR
	X3.3	The design team's understanding of the applicable regulatory standards
	X3.4	Understanding of the design team in estimating the duration of each activity in design and build work
	X3.5	Understanding of the design team in estimating the cost of implementing design and build work
	X3.6	Communication between personnel involved in the design and implementation
X4. Execution Ability	X4.1	Contractor experience in carrying out design and build work

(continued)

Table 2. (continued)

Risk Category	Risk Code	Risk Details
	X4.2	Contractor's competence in carrying out design and build work
	X4.3	The contractor's cash flow ability to carry out design and build work
	X4.4	The contractor's understanding of the develop design that has been mutually agreed upon between the design team and the owner
	X4.5	Availability of equipment and machinery for contractors to carry out design and build work
	X4.7	Coordination and communication between sections in the contractor's work organization
	X4.8	The suitability of the number of manpower with existing jobs
	X4.9	The contractor's ability to management capacity and quality control of design and build works
	X4.11	Delay in receiving material at the time of execution of work
	X4.15	Difficulty access to the project location during the execution of the work
	X4.18	Poor quality of subcontractors
	X4.22	Negligence and delays from subcontractors
	X4.23	Wrong design that causes job change
	X4.25	Execution of work not in line with Terms of contract
X5. Project Manager Ability	X5.1	Project manager experience in carrying out design and build work
	X5.3	Project manager experience in dividing tasks and responsibilities
	X5.4	Project manager experience in scheduling all work activities
	X5.5	Project manager's ability to communicate and coordinate with the owner during the design and build work
	X5.6	Project manager's commitment to the quality, cost and time of design and build work
	X5.7	Project manager's ability to schedule monitoring and control meetings during the design and build work

(continued)

Table 2. (continued)

Risk Category	Risk Code	Risk Details
	X5.8	Project manager's ability to communicate and coordinate with his team and subcontractors
	X5.9	Project manager competence in carrying out design and build work
	X5.10	Project manager skills in leadership and motivating his team
X6. Project Scope	X6.1	Conformance of design specification standards
	X6.2	Clarity of project scope definition in TOR
	X6.3	Changes in the government's political and economic situation or policies
	X6.5	Clarity of project scope definition in Contract
	X6.6	There is a change in the scope of the design during the execution of the work
	X6.7	Changer order in the field are not supported by changes to the contract / addendum
	X6.8	Different field data

4 Conclusion

This study aims to develop a standard risk-based audit method for Design and Build contracts to be used in the construction of stadium projects. Can be concluded:

1. From the results of the literature study, questionnaires and expert validation, there are 28 audit processes and 88 DB contract audit activities from the perspective of the Project Owner.
2. There are 6 risk categories and 60 dominant risk indicators that influence audit process disputes in stadium project design contracts, these dominant risks have been validated by experts from the Ministry of PUPR.
3. The future research direction is to obtain expert validation of risk path mapping for dominant risk and mitigation.

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