Development Of Risk-Based Audit Method Standard For Stadium Project Using Design And Build Contract To Minimize Dispute Based On Inspectorate Perpective

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Abstract.
Construction projects have been developing from the management side year by year. One of the problems that government has been facing government construction projects over the years is the duration of the procurement process that takes too long which is hard to be implemented if the project is urgent in terms of time. This creates the urgency to seek the solutions to the problem of how to shorten the time of the procurement process. The design and build integrated contract method that unites the planning and implementation process simultaneously is able to answer these problems and shorten the procurement time of government construction projects. However, there are many disputes faced by construction projects that use integrated design contracts post-project, one of which comes from the Government Internal Supervisory Apparatus (APIP) or commonly called the Inspectorate. This is because there are several different standard between the inspectorate and the owner or contractor that has been used in the process of government construction projects Audit. This study aims to identify the standards of the audit process of the Inspectorate, analyze the risks that cause disputes, and to develop standards for risk-based audit methods for design and build-based construction projects in order to minimize disputes that occured from the inspectorate side of perspective.

Keywords: *Audit, Risk, Design and Build, Project Management, and Construction.*

I. INTRODUCTION

Indonesia's economic improvement program is strongly supported by the existence of the right infrastructure. Infrastructure plays an important role in improving the quality of life of the Indonesian people and increasing Indonesia's competitiveness in the world. One of the factors that requires this acceleration is the need for infrastructure to support the process of running the Asian Games in 2018. The integrated design contract is used in most of the Asian Games' infrastructure development projects, especially the Stadium Construction Project. The use of this design contract is intended to shorten the procurement time given the urgent infrastructure needs of the 2018 Asian Games. Instead of shortening the time, construction projects with designs implemented have suffered many disputes from various government audit agencies One of them is the inspectorate. In dealing with this, this research has 3 research questions, namely,

- Identify audit activities and objectives carried out on stadium building work with design contracts;
- Identifying risk categories and dominant risk factors that occured in each activity that make the objectives are not achieved in the carried out audit process on stadium building work with a design contract;
- Develop a strategy to improve the audit process of stadium building work with a design contract based on the dominant risk factor that has an impact on disputes.

As mandated in article 53 of Government Regulation Number 60 of 2008 concerning the Government Internal Control System, that to maintain the quality of audit results carried out by APIP, an Audit Standard is compiled which is a minimum quality criterion or measure to carry out government internal audit activities. The assignment of Financial Audit must use the State Financial Examination Standard (SPKN) and/or the Professional Standard of Public Accountants (SPAP) in accordance with laws and regulations. The following are the standards for conducting examinations according to SPKN 2017:

1. Internal Audit Assignment Planning or APIP

   In this process the auditor develops and documents a plan for each assignment, including the objectives, scope, timing, and allocation of assignment resources.

2. Implementation of Internal Audit Assignment;
   In this process the audit identifies, analyzes, evaluates, and documents adequate information to achieve an internal audit assignment. The identified information is called relevant if it logically supports or corroborates an opinion or argument related to the objectives and conclusions;
3. Communication of Internal Audit Assignment Results
   Auditors report weaknesses in the internal auditi control system that have a significant influence, while those that do not have a significant effect are simply conveyed in the form of a letter (management letter);
4. Publication and Distribution of Reports
   The report on the results of the internal audit through the report must be made in a form and content that is understandable to the auditi and other related parties;
5. Auditee Response
   The auditor shall request audit responses/opinions to the conclusions, facts, and recommendations including planned corrective actions, in a timely manner from the responsible auditing officer. The responses given are in the form of promises or plans of corrective action and must be evaluated and understood in a balanced and objective manner even if the audited responses are contrary to the conclusions of the audit report.
6. Distribution of Audit Results
   Communicate the results of the audit report in a timely manner to the assignor and interested parties in accordance with laws and regulations.
7. Follow-up and Monitoring
   Follow-up monitoring and assessment aims to ensure that appropriate actions are implemented by the auditi as per the recommendations. If the auditi has followed up on the recommendations in a way that is different from the recommendations given, but also lies in the effectiveness of the follow-up of the recommendations.

Design and Build as understood today was invented by contractors in the early 1960s, when many construction contractors began offering service packages. This contractor provides a complete package that is contrary to conventional procurement methods, which involves signing a separate contract agreement between the planning consultant and the contractor who acts as the executor of the construction [14]. Design and Build is a project execution method that provides engineering services for design by integrating a single engineering contractor with the building owner into a single contract[13]. This contract is a construction contract for work related to the construction of a building where the supplier is responsible for the design and build of construction. Based on the applicable provisions, namely PermenPUPR No.1/PRT/M/2020, it is explained on Table 1. that design and build type of contract only can be used on complex and urgent type of project as follows.

Table 1. Design and Build Type of Contract Criteria

Complex work	Urgent Work
• High Risk; • High Technology Necessity; • Using specially designed equipment; • Have difficulty being technically defined regarding how to meet procurement needs and objectives; • Have a condition of uncertainty or unforeseen	• Economically and/or socially provides more value to the community ; • Immediately utilized ; • Design and construction work are not enough time to be carried out separately like conventionally

During the execution of this design and construction contract, problems often arise including an audit of the work in which the validator conducts the necessary assessment in detail of the quantity and price of the construction of the unit. This certainly causes differences in perception between evaluators and evaluators. In Table 2. you can see projects that use design and construction contracts along with the problems that arise in each project,

Table 2. Occurred Dispute on Design and Build type of Contract

No	Project	Type of Contract	Dispute
1.	Bogor Ring Road Toll Road Project	Design and Build	1. There is no clear separation between TOR/ER/KAK and the contractor's proposal; 2. The definition of variation is unclear;
2.	Soekarno Hatta Airport Ultimate T3 Terminal Project	Design and Build	1. The definition of variations and variation procedures for the stages of the design process (changes to the basics of design with design details) is not clear; 2. Design changes were made many times to TOR and performance criteria, resulting in significant differences in the initial volume of contracts against the realization of installed work, VO calculations became difficult and the nature of LS became unclear.
3.	MRT Project	Design and Build	1. Dispute related to late issuance of payment certificate 2. Dispute over the VO administration and payment process
4.	Asian Games 2018 Project	Design and Build	The fair value of the project price of RP 5.3 trillion caused by the beginning of the work of the PPK of the Ministry of PUPR did not carry out the preparation of the RAB used in determined price (HPS)

In the construction/renovation carried out at the Gelora Karno Main Stadium, which is the project of the 18th Asian Games 2018, there are differences in the auditor's perception that the implementation of the building work with design and results-based contracts. Construction - Outcome assessment (performance based), only checking the relevance of the results. As seen in Figure 1., problems in the execution of design and construction contracts have reduced the effectiveness of design contracts that indirectly make owners or bouwheers hesitate to use design and build type of contracts,

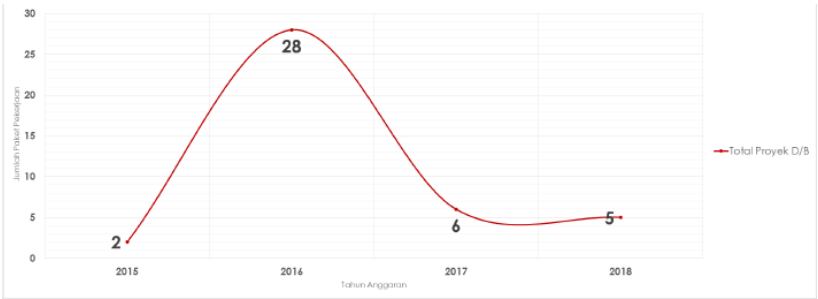

Fig 1. FTIR spectra of phthalo blue (BPc) paints: Acrilex, Corfix, Corfix Arts (BRA) and Liquitex (USA)

Risk can be defined as uncertainty about the outcome, whether it includes positive opportunities or negative threats to an event [12]. Risk is a potential deviation from the expected outcome, this deviation is a deviation of an adverse and undesirable nature from an event or event that threatens success and the magnitude of the relative risk can be determined [8]. So that in the process of auditing infrastructure development that goes through several stages and complexes, it is necessary to have a risk-based examination. This risk-based examination is an examination that is focused and prioritized on business risks and processes as well as control over risks that can occur [11]. Risk Based Audit is an audit technique where all audit activities starting from audit planning, audit implementation, and reporting of audit results are based on the company's risk priorities that have been set with operational management by conducting risk assessments. Risk Based Audit is very important to run because it can help fulfill management

responsibilities effectively. There are 3 objectives of this study which include (1) Identifying the audit process, (2) Knowing the details of dominant risks and risks, and (3) Development strategies.

II. 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 BPK auditor (3) pilot survey, (4) questionnaire, (4) expert validation, and (5) final expert validation. Furthermore, the data analysis was conducted using SPSS as can be seen in the flowchart in Figure 2.

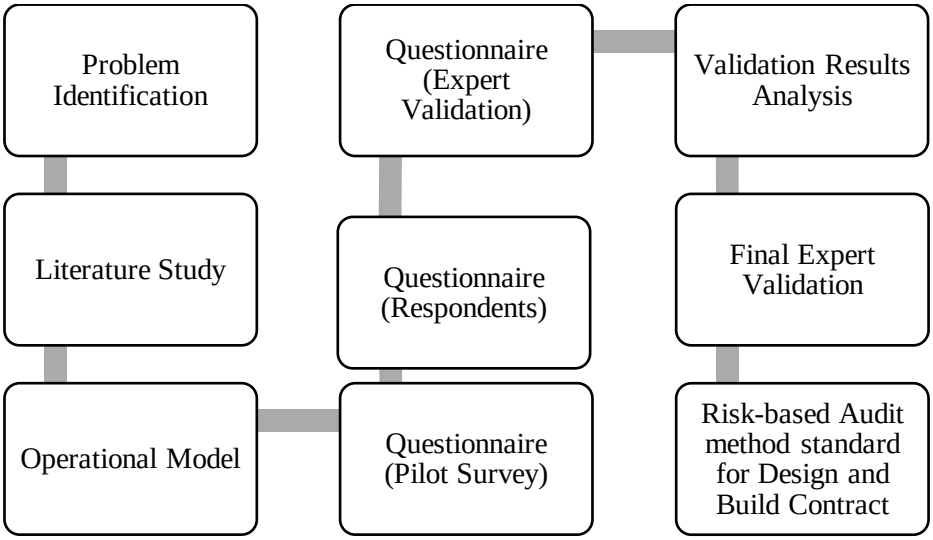

Fig 2. Research Flow Diagram

III. RESULT AND DISCUSSION

Audit Process in Inspectorate

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 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 the expert validates and agrees that all audit activities dan processes in the Inspectorate refer to the SPKN which consists of 28 audit processes. Here are the 28 processes approved by the Expert Inspectorate for the stadium building design contract project,

Table 3. Validated Audit Process by Inspectorate Expert

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

12	Contract Documents	27	Maintenance period
13	Implementation Preparation	28	Second Handover

Risk Details and Dominant Risk

The risk categories and dominant risk factors that occur in each activity is gathered from literature study there are 87 risk factors on the DB audit process and activities. The experts of 29 respondents validated and agreed that all 87 details of risk affect the audit process at the Inspectorate. Furthermore, 55 of the 87 variables fall into the high risk category. The risk level indicator itself refers to the PMBOK 6th Edition [7] which is as follows,

Risk Likelihood	Risk Severity				
	Very High (5)	High (4)	Medium (3)	Low (2)	Very Low (1)
Frequent (5)	**Very High**	**Very High**	**Very High**	**High**	**Moderate**
Occasional (4)	**Very High**	**Very High**	**High**	**Moderate**	**Low**
Remote (3)	**Very High**	**High**	**Moderate**	**Low**	**Very Low**
Improbable (2)	**High**	**Moderate**	**Low**	**Very Low**	**Very Low**
Extremely–Improbable (1)	**Moderate**	**Low**	**Very Low**	**Very Low**	**Very Low**

Fig 3. Risk Matrix

Based on the risk matrix and color indicator, 55 of the 87 risk details are included in the high risk category and the rest are included in the moderate category. The following are the risk details along with a description of the risk category of each risk detail,

Table 4. Validated Risk Details

Risk Category	Risk Code	Risk Details	Risk Category	Risk Code	Risk Details
XI. Owner Management Ability	X1.1	Unrealistic project schedule by owner		X4.2	Contractor's competence in carrying out design and build work
	X1.2	Availability of owner personnel to handle Design and Build work		X4.3	The contractor's cash flow ability to carry out design and build work
	X1.3	Owner's planning experience in making Design and Build Terms of Reference (TOR)		X4.4	The contractor's understanding of the develop design that has been mutually agreed upon between the design team and the owner
	X1.4	Owner's understanding in determining the duration of the Design and Build work		X4.5	Availability of equipment and machinery for contractors to carry out design and build work
	X1.5	The owner's ability to evaluate the results of the development design submitted by the Contractor		X4.6	Contractor's ability in project management (HR, finance, OHS, etc.)
	X1.6	work sequence planning that is not well structured		X4.7	Coordination and communication between sections in the contractor's work organization
	X1.7	Owner's desire to provide input on the work design		X4.8	The suitability of the number of manpower with existing jobs
	X1.8	The quality of the owner's communication with the design team when developing the design		X4.9	The contractor's ability to management capacity and quality control of design and build works
	X1.9	Availability of experts, Construction Management consultants, to assist the owner during the implementation of DB work		X4.10	Job suitability with educational background
	X1.10	Owner's desire to make changes during implementation		X4.11	Delay in receiving material at the time of execution of work
	X1.11	The owner's understanding in calculating the budget for design and build work. due to unrealistic prices		X4.12	The occurrence of damage or theft of equipment, materials and other project facilities during implementation of work
	X1.12	Owner's limited budget		X4.13	The presence of work accidents during the implementation of work

	X1.13	Limited authority of the personnel owner in decision making		X4.14	Absence of supervision at the time of material fabrication
	X1.14	Experts with appropriate educational background		X4.15	Difficulty of access to the project site during the work implementation
	X1.15	Regulations that apply to project success		X4.16	The method of implementation is not in accordance with field conditions
	X1.16	Good managerial organization for project success		X4.17	There are obstacles during the foundation pole drilling work
	X1.17	Expert's capability, or experts who do not have a certificate of expertise		X4.18	Poor quality of Subcontractors
X2. Procurement Process	X2.1	Availability of experienced Design and Build companies		X4.19	Material damage during shipping
	X2.2	Incomplete technical assessment criteria in assessing the qualifications of bidders		X4.20	Traffic Jams
	X2.3	Delays in the process of making contract documents		X4.21	Quality of work relationship between contractor and owner
	X2.4	Time available for bidders to prepare tender		X4.22	Negligence and delays from subcontractors
	X2.5	The time available for the owner and procurement team evaluating the DB documents from bidders		X4.23	Wrong design that causes job change
	X2.6	Negotiation process not consider reasonable offer price		X4.25	Execution of work not in line with Terms of contract
	X2.7	Delay in the tender process		X4.26	Reports are not carried out or carried out or incomplete
	X2.8	Unclear tender terms and condition announcement		X4.27	After-sales guarantee cannot be realized
	X2.9	Incomplete Tender Document by Participant	X5. Project Manager Ability	X5.1	Project manager experience in carrying out design and build work
	X2.10	Selection of procurement method doesn’t match according with provisions		X5.2	Project manager experience in selecting personnel involved for design and build projects
	X2.11	Selection of evaluation method doesn’t match according with provisions		X5.3	Project manager experience in dividing tasks and responsibilities
	X2.12	Owner doesn’t respond to Participant request of explanation		X5.4	Project manager experience in scheduling all work activities
	X2.13	Field explanation wasn’t carried out by owner		X5.5	Project manager's ability to communicate and coordinate with the owner during the design and build work
	X2.14	Tender winner is not exist		X5.6	Project manager's commitment to the quality, cost and time of design and build work
	X2.15	Tender winner transparancy		X5.7	Project manager's ability to schedule monitoring and control meetings during the design and build work
X3. Planning Skills	X3.1	Design team experience in making design		X5.8	Project manager's ability to communicate and coordinate with his team and subcontractors
	X3.2	The design team's understanding of the design needs requested by owner in line with TOR		X5.9	Project manager competence in carrying out design and build work
	X3.3	The design team's understanding of the applicable regulatory standards		X5.10	Project manager skills in leadership and motivating his team
	X3.4	Understanding of the design team in estimating the duration of each	X6. Project	X6.1	Conformance of design specification standards

		activity in design and build work	Scope		
	X3.5	Understanding of the design team in estimating the cost of implementing design and build work		X6.2	Clarity of project scope definition in TOR
	X3.6	Communication between personnel involved in the design and implementation		X6.3	Change of higher ups regulation and policy
	X3.7	The design team's understanding of the design changes requested by the owner at the time of design development		X6.4	Conditions and environment are not as expected
	X3.8	Contractor input to the design team (building knowledge) during design development		X6.5	Clarity of project scope definition in Contract
	X3.9	Delay in design agreement in design development, due to differences in the perception of owner and design team		X6.6	There is a change in the scope of the design during the execution of the work
	X3.10	Job suitability with educational background		X6.7	Changer order in the field are not supported by changes to the contract / addendum
X4. Execution Ability	X4.1	Contractor experience in carrying out design and build work		X6.8	Difference occurred between field and reporting data

Strategy for Improvement and Refinement Audit Standard

After knowing the dominant risks from each detail of the risks, the risks are grouped based on audit activities. But before those risks are grouped, each risk detail is given a risk mitigation. Risk mitigation is prepared based on the results of literature studies. Basically expert in Inspectorate focus on understanding the regulations and management capabilities of design projects and the importance of setting unit prices per square meter for stadium buildings.

IV. CONCLUSION

. In Conclusions This study aimed to develop a risk-based audit method standard for Design and build contract which will be used in the construction of stadium projects. It can be concluded:

1. As a results from literature, there is 28 audit process that has been validate by the expert from Inspectorate institution. Furtheremore, from that 28 audit process, it was identified there is 87 audit activities for Integrated Design and Build type of contract for government construction projects
2. There is 6 categories of risk which consist of 87 audit activities, 86 of them dianggap sebagai aktivitas audit dengan risiko dominan berdasarkan perhitungan frekuensi dan dampaknya dari masing-masing aktivitas audit.
3. Future direction of this research will requires validation from experts to determine the mitigation of each dominant risk to be able to set audit standards for integrated design and build contracts, especially in stadium buildings. Shortening and summarizing each survey carried out will also be very useful in order to make it easier for experts to fill out questionnaires without reducing the quality of each expert's answers.

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