Development of Operational Standards for Risk-Based Cultural Heritage Office Building Maintenance Procedures That The Building Safe and Comfortable to use (Study Case Heritage Office Building PT.Asuransi Jiwasraya)

Yunita Dian Suwandari
Civil Engineering Department,Engineering Faculty,University of Indonesia

Leni Sagita Riantini
Civil Engineering Department,Engineering Faculty,University of Indonesia

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ABSTRACT

Maintains a sustainable heritage building is currently a crucial challenge.The heritage building is unique from its structure and values such as a historical, education, aesthetics, economy, architecture,community and it requires special handling. One of the problems of heritage buildings in the absence of operational standards (SOP) for maintenance in Indonesia. The purpose of this study to develop a standard operational model maintenance heritage building of risk-based.The research data compose of literature review, questionnaires, and qualitative risk data analysis.The risk analysis identified 25 risks of 40 risk variables have the highest risk rank. The result of the study established a risk-based SOP heritage building maintenance.The conclusion is that it can support the management in improving the quality of heritage building maintenance practice.

Keywords*:* Business Process, Heritage Building,Maintenance building, Risk,Standard Operating Procedure

1. Introduction

PERMENPU No. 24 of 2008 is a government regulation that regulates building maintenance, with activities to maintain the reliability of buildings along with infrastructure and facilities so that the building is worthy of function. Maintenance of building is an activity to repair / replace parts of a building, components, building materials and / or infrastructure and facilities so that the building remains functional. Maintenance to ensure the building has good performance and optimum operation becomes a very important part of the building. This maintenance serves to increase the age of the building and avoid damage to building elements, especially elements that are characteristic of national history. Increasingly severe building damage is one of the important factors for making building maintenance policies and to help ensure the conditions needed for buildings operate optimally (Rocha, 2017). Other regulations regarding state buildings are stipulated through Presidential Regulation No. 73 of 2011 concerning Construction of State Building Buildings. In article 18 regarding maintenance costs, point 5, is set for the cost of maintenance of state building which is included in the category of cultural heritage buildings, the amount of maintenance costs is calculated according to real needs.

Cultural heritage buildings have different conditions than modern buildings. Special handling is needed because the type of material and the historical value contained in it requires specific handling (MN.Baharuddin, 2014). Management of building maintenance, especially in historic buildings that require special attention and handling is very necessary so that the building is maintained with good standards. The many problems that must be identified such as a limited budget, human resources who understand the techniques of maintaining old buildings that are limited and the absence of operational standards for building procedures that enter cultural heritage buildings become a separate problem (Seong Yeow Tan, 2016). Various damage that occurred in the cultural heritage building was caused due to lack of maintenance which resulted in the high cost of renovation. Periodic building maintenance is a critical point for a surviving building both cultural heritage buildings and non-cultural preservation (Idrus, 2010).

In Indonesia the rules regarding the maintenance of cultural heritage buildings use Law No. 11 of 2010 and Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia number: 01 / prt / m / 2015 concerning Preserved Cultural Heritage Building. In the regulation it is required that each preserved cultural heritage building must meet administrative and technical requirements. In these technical requirements there are categories of reliability requirements for cultural heritage buildings, namely safety, health, comfort and convenience. In the implementation there is a team of cultural heritage experts who have expertise from various fields of science and have competency certifications to provide recommendations for setting, ranking and eliminating cultural heritage. The expert team of cultural heritage building (TABG-CB) provides technical considerations in the stages of preparation, technical planning, implementation, utilization and demolition of cultural heritage buildings.

In Jakarta, there is a cultural heritage area, the Old City area. The Jakarta Government in its efforts to preserve and utilize the Old City of Jakarta was realized by Government Regulation No. 50 of 2011 concerning the Master Plan for National Tourism Development in 2010-2015. There are more than 100 cultural heritage buildings in the Old City Region, the majority of which are inherited from Dutch colonialism (Arief Rahman, 2015). The seriousness of the Government to develop the City Area is shown by registering Kota Tua Jakarta as a world cultural heritage city to Unesco (Natasha, 2015) but in 2018 Unesco's International Council on Monuments and Sites (ICOMOS), finally did not recommend becoming one of the world cultural heritage due to Indonesia failed to demonstrate the distinction of the Old City (Republika, 2018).

If we look at the condition of cultural heritage buildings in other countries such as Malaysia where the management of maintaining the cultural heritage building is very good. The Malacca City area is part of the world heritage award from the United Nations Educational, Scientific and Cultural Organizations (Unesco) in 2008 (Unesco, 2008). This area consists of buildings built in the Portuguese, Dutch and British times (Soo-Fen Fam, 2017). The core of Malaysia's success so that successfully making the City of Malacca a part of world heritage from 2008 was consistency in maintaining cultural heritage buildings so that has a positive impact on Malaysia's foreign exchange through tourism sector revenues (Envoy, 2015 quoted by Soo, 2017). As many as 3,900,000 tourists visited the city of Malacca in 2014 (Data from the Ministry of Tourism, 2014). Laws in Malaysia regarding cultural heritage buildings are regulated through the National Heritage Act 2005. The department responsible for all requirements for cultural heritage buildings is the National Heritage Department of Malaysia which was formed in 2006 (SN Harun, 2011).

The standard operating procedures (SOPs) for maintenance and maintenance of components are very important so that the implementation of maintenance and maintenance activities according to procedures is well scheduled and makes it easier for workers to carry out maintenance and maintenance activities (Jalil, 2014). Maintenance that is not in accordance with the type of material and the type of damage makes the cultural heritage building worse the condition will even cause serious damage such as damage to the structure so that the building will endanger the occupants. Ignorance of building owners on the technical maintenance of cultural heritage buildings is one of the factors in failure to maintain cultural heritage buildings. The impact of not optimal maintenance of the building is the lack of interest of investors to rent the building and even if there is a low price (Seong Yeow Tan et al., 2016).

The maintenance and management of the cultural heritage building at PT. Asuransi Jiwasraya (Persero) has been carried out by the Property Division Y . This Division is also responsible for renting out assets, both buildings and land, to third parties to increase company revenue. PT Asuransi Jiwasraya (Persero) has cultural heritage buildings in all regions in Indonesia as many as 41 buildings that were built on average in the 19th century. The cultural heritage building is divided into groups of office buildings (11 buildings) and houses (30 houses) which are currently 59 % in a state of care that is less optimal and requires renovation (source: Report on PT. Asuransi Jiwasraya, Cultural Heritage Office building data).

2. Research Objective

The objective of the study are:
1. Identifying the maintenance of cultural heritage buildings in other countries
2. Comparing between SOP of existing cultural heritage buildings other countries
3. Identifying and analysing the risks in maintain activity of cultural heritage buildings
4. To develop operational standards for risk-based cultural heritage building maintenance

3. Literature Review

The maintenance heritage building international practice

Mohd-Isa (2011) in his journal with the title “Built Heritage Maintenance : A Malaysia Perspective” describes the criteria of conservation principles based on the international charter. Figure 1 describes the categories of conservation values and good conservation practice based on international practice.

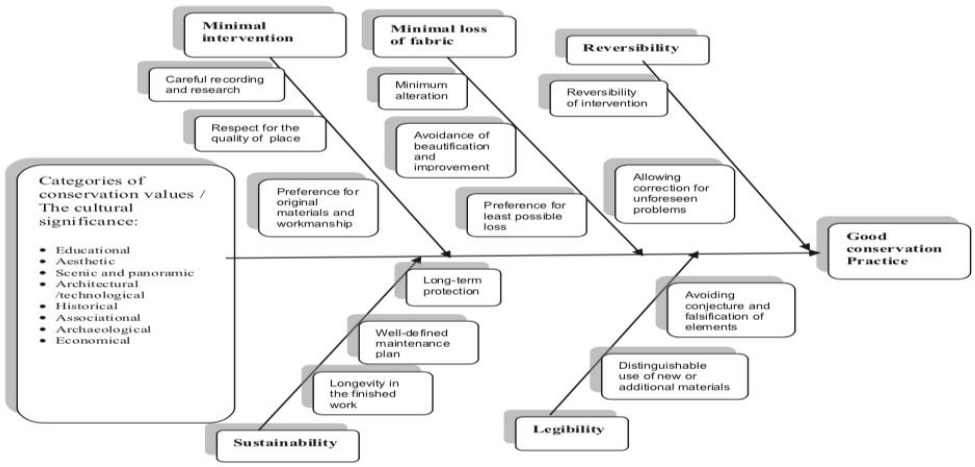


Figure 1: Good Conservation Practise based on international practise

Many owners of this building do not understand the maintenance techniques that cause the building to be neglected and if there is damage the repair costs are very expensive in the study by Seong (2016) entitled "Maintenance of Heritage Buildings: A Case Study from Ipoh Malaysia". Difficulties in the maintenance of old buildings were also revealed by MN Baharuddin (2014) with the title "Analysis of the Critical Factors and Difficulties in Maintaining Historical Building. Damage to school buildings over the age of 100 years was also observed through research conducted by Kartina Alauddin (2016) with judgments "The Observation of the Effect of School Buildings over 200 Years old in Perak" and found that the types of damage were relatively the same. International conservation practices were used as a basis for setting guidelines for the application of historic building maintenance in Malaysia as examined by Mohd-Isa (2011) in the title "Retrofing historic buildings for

office buildings was disclosed by Olubukola (2017) and explained that this study was to reveal retrofing bottlenecks in UK with the title "Built Heritage Maintenance: A Malaysian Perspectives. Knowledge of the practice of maintaining historic buildings in Malaysian Malacca was investigated by Hasif Rafidee Hasbollah (2015) in his title "Understanding Current Practice on Conserving Heritage in Malacca". Health monitoring of historic buildings through technology is examined by Istvan Vidovszky (2016) with the title "Impact Based Diagnostic Approach for Maintenance Monitoring of Historic Buildings" This study uses BIM technology as an alternative method of identifying building damage. The framework for conservation activities is urgently needed so that this historic building can be maintained properly according to the research of Arazi Idrus (2010) in its title "Maintenance management Framework for Conservation of Heritage Buildings in Malaysia". Ashral Rahman (2018) revealed the same thing through his research entitled "Maintenance of Success Factors for Heritage Buildings: A Framework". ZA Akasah (2009 and 2010) in the research title "Analysis and Development of the Generic Maintenance Management Process Modeling for the Preservation of the Heritage School Buildings" and "Maintenance Management Process Model For School Buildings: An Application of IDEF Modeling Technology" states that building preservation schools included in historic buildings require special maintenance and maintenance modeling. Best practice for sustainable building maintenance was examined by Mahmoud Sodangi (2014) in his research title "Best Practices Criteria for Sustainable Maintenance Management of Heritage Buildings in Malaysia". The way to assess cultural heritage buildings to be included in several categories that have been determined by the government is examined by Retno H (2016) in the title "Analysis of the Assessment of Cultural Heritage Buildings". BM Major (1999) examined the trends of historic buildings designed to be part of world heritage with his research entitled "Development of an Integrated Conservation and Maintenance Management Regime for Historic Modern Movement Buildings". Conservation requires costs and conservation is a complicated job because it depends on the type of building, materials and skilled workers. This research was conducted by Lim Yoke Mui (2010) in his research title "Element Cost Format Building Conservation Works in Malaysia". Comparison of maintenance of historic buildings between Belgium and Portugal was examined by Veronique Hutsebaut-Buysse (2016) in the title "Maintenance Buildings in Belgium and Portugal"

Risks in maintenance heritage building

The absence of standard standards in maintaining historic office buildings causes its own difficulties in the process of maintaining the building. Nur Atakul (2014) in his research entitled "Risk management for Sustainable Restoration of Immovable Cultural Heritage, part 1: PRM Framework" so that standards were needed in the process of maintaining historic buildings. Muhammad Jamaluddin Thaheem (2014) in his research entitled "Sustainable Repair and Maintenance of Buildings in The Developing Countries; A Risk Management Perspective and Proposal "states that there is a need for standardized standards for maintaining Historical Buildings based on risk. Naif Adel Hadad (2017) stated in his research "Notes on Anthroponic Risks on Mitigation Management and Recovery of Ancient Heritage Teams" that anthroponic risk mitigation management and the return of ancient cultural heritage theaters by exploring human-caused risks and technical risks, vulnerabilities and its impact on ancient theater. Identification risks include structural risks due to the placement of modern equipment and the risk of human-caused structures. The

4. Methodology

To answer the research question, this study was undertaked qualitative method. Deep interviews for acquiring the data and surveys were conducted using questionnares. The responden was choosen based on their experience in maintain heritage building. The data compose business process,activity, input,output, and risk identification. Probability and impact factor analysis was used for analysed the data then perform the highest risk factor. Furthermore, the SOP development created in maintain of risk-based heritage building . The process stages of research as follows :

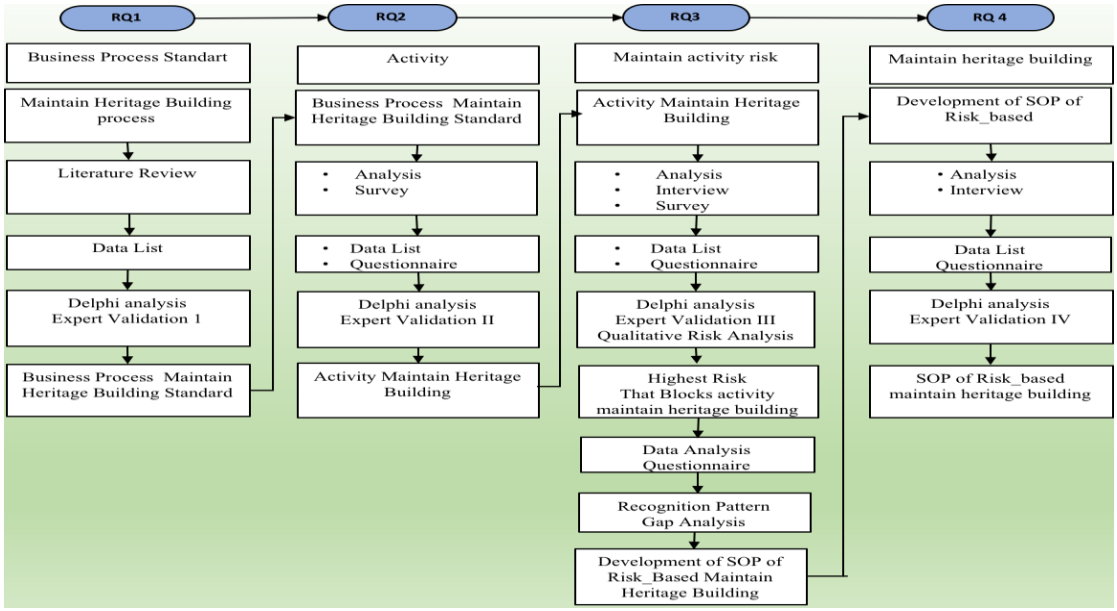


Figure 2. The Research flow diagram

5. Result and Discussion

a. To answer RQ1

Maintenance of cultural heritage buildings in other countries

- United Kingdom

  The regulation of conservation, policy and the guideline of maintaining heritage building was established in "Conservation Principles,Policies and Guidance".
- Irlandia

  The guildeline of maintaining heritage building was established in a guide to the care of older buildings (2007)
- Netherland

  The monumentenwet (Monumen and Historic Building Act) was established in 1961as a foundation and integrated to the law and planning regulation which is named "protected townscape"
- Malaysia

  Conservation practise maintain heritage building in Malaka,Malaysia, based on The National Heritage Act of Malaysia,The outstanding Universal Values (OUV) ,The guidelines for conservation of heritage buildings in Malaysia (GCHB) dan Conservation Management Plan of Malacca (CMP)

To compare with Indonesia's regulation , Law No. 11 of 2010 and Regulation of the Minister of Public Works and Public Housing of the Republic of Indonesia number: 01 / prt / m / 2015 concerning Preserved Cultural Heritage Building are used for the rules of maintaining of cultural heritage buildings. However, the clear guidelines for conservation of heritage buildings in Indonesia is not established yet, the government formed TABG-CB as the team can function as a unit in charge of guarding and providing input for activities to restore Cultural Heritage Buildings.

b. To answer RQ2

SOP of existing cultural heritage buildings and the results of comparing to other countries' SOPs

There is a comparation between SOP existing of the maintenance heritage building and benchmarking. Figure 3, describe SOP of an existing maintenance building in PT Asuransi Jiwasraya (Persero) .

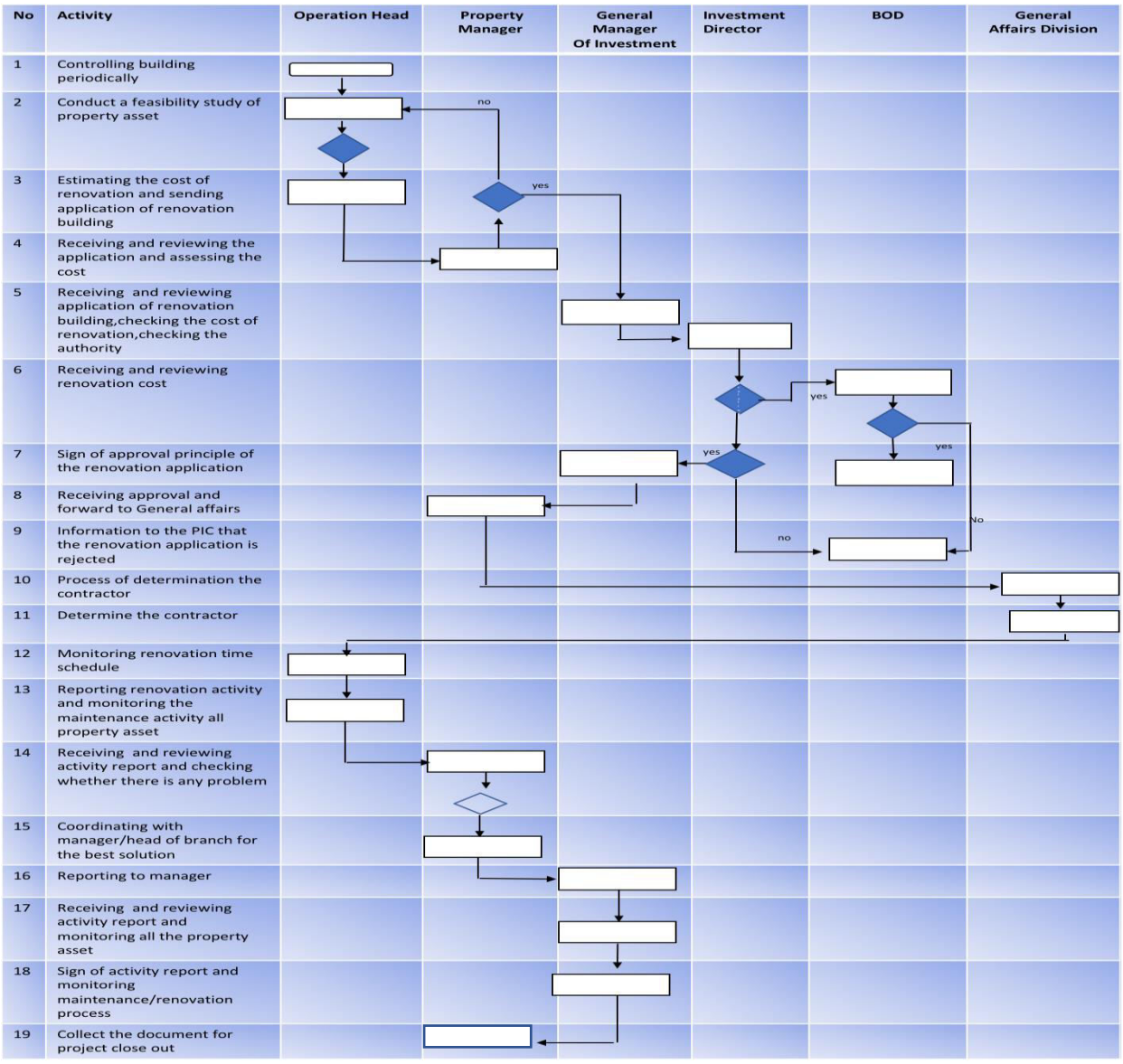


Figure 3. SOP existing of the maintenance building

Note:

: The start or end

: A Decision

: A process

Comparing to other countries' SOPs for benchmarking , there is different process in maintaining heritage building. Figure 3 shows that the SOP is not specifically on SOP cultural heritage building maintenance. Table 4 illustrates the comparison of business process and activity. After comparing, the next step was develop the SOP of maintenance heritage building . Thus, the SOP was validating to expert with more than 5 years of experience in maintain heritage building and person in charge in company X. The list of activity data was obtained as in table 5. The new SOP consist of 6 business process and 23 activity.

Table 4. The comparation SOP existing PT X and SOP benchmarking

No	Number of Business Process and activity	Business Process	Activity	Source
1	Existing	1	19	Data PT X
2	Benchmark	6	24	ZA Akasah,2010
3	The New SOP	6	23	

Table 5. SOP development of maintenance heritage building

No	Business Process	Number of Activity
		Development SOP
1	Determine building status	3
2	Evaluation building damage	4
3	Estimate maintenance	4
4	Plan maintenance activity	4
5	Implementation maintenance	5
6	Evaluate and report maintenance	3

c. To answer RQ3

Risks can affect the maintenance of cultural heritage buildings. This stage has identified the risks which can impose potential barriers in the business process when maintaining heritage building in company X. There were 40 risks from 23 activities and pilot survey to the expert was conducted for assessing the list. Furthermore, the questionnaires were distributed to 17 respondents with more than 2 years of experience handling activity in maintaining heritage building. The result of the questionnaires performing the assessment of Frequency and Risk Impact. The formula as following

R=PxI

Where: R= Risk factor,P = probability, I=impact

Analysing data was using probability and impact matrix. The risk was divided into 3 categories: high risk, moderate risk, and low risk. Based on the result, there were 25 high risks identified.

Table 6. 25 high risks

Ranking	Riks	Business Process	
1	Inaccuracy information on building history	X1	Determine building status
2	Inaccuracy technical building when conduct observation like structure checking,material building	X2	Evaluate and estimate defects
3	Lack of knowledge of how to maintain their heritage building	X2	Evaluate and estimate defects
4	There is no schedule for maintain heritage building activity	X5	Impelementation maintenance
5	Building intervention cause building damage or missed historic value like changing the facade inappropriate with the permission	X5	Impelementation maintenance
6	The mistake when determining building usage	X2	Evaluate and estimate defects
7	There is no logbook or history of maintenance heritage building activity	X2	Evaluate and estimate defects
8	Lack of budget for repair the building	X5	Impelementation maintenance
9	Incompelete building data eg location drawing,techical specification	X1	Determine building status
10	An unskilled human resource who handle the maintenance of heritage building	X4	Plan maintenance activity
11	Inefective communication between owner and contractor in the renovation process building	X5	Impelementation maintenance
12	Inacuracy building data maintenance	X2	Evaluate and estimate defects
13	Lack of a technically skilled person in maintenance	X5	Impelementation maintenance
14	Incompelete data maintenance analysis because don't understand the differences between heritage building and non-heritage building	X4	Plan maintenance activity
15	Lack of supervision from the owner on contractor performance so impose the quality problem	X5	Impelementation maintenance
16	Bad quality control in maintain activity	X6	Evaluate and report maintenance
17	The mistake when determining budget and time schedule planning	X3	Estimate maintenance
18	There is no specification and standard for maintaining a reference heritage building	X1	Determine building status
19	Human error when making a definition about scope and repair building purpose like the building parts possible for dismantle or not	X2	Evaluate and estimate defects
20	the building material inappropriate for requirement in a heritage building	X5	Implementation maintenance
21	Delay in progress work	X6	Evaluate and report maintenance
22	Incomplete data such as technical data and price	X4	Plan maintenance activity
23	There is no plan for implementing safety building regulation	X2	Evaluate and estimate defects
24	Error when identification priority building repair	X1	Determine building status
25	Bad leadership because of lack of supervision from owner about heritage building renovation regulation	X5	Impelementation maintenance

Table 6 describes the findings can conclude the most twenty five barriers of important level that influence in maintain heritage building. The highest risks of 3 ; inaccuracy information on building history, inaccuracy technical building and lack of knowledge illustrates that previous data ,human skill and knowledge are becoming the most potential which can barrier in maintain heritage building. After identifying the high risks , the experts

was asked to give their opinion whether they were agree or disagree. In addition they provided cause, impact, preventive and corrective action.

d. To answer RQ 4

After analyzing risk of data, the preventive and protective actions occur the SOP development. The next step is creating SOP heritage building maintenance of risk-based. The SOP development was composed of 6 business process and 23 activities. Figure 4 shows one of the examples based on figure 3, the highest risk is inaccuracy information on building history and it is on determining building status process. In existing SOP, activity number one (controlling building periodically), it can develop to be three activities (building checking, identification of maintenance needs and verification of maintenance needs). This finding appropriates with the literature which is used in this research. The result has been validated to experts who have responsibility all the business process in PT.Asuransi Jiwasraya (Persero)

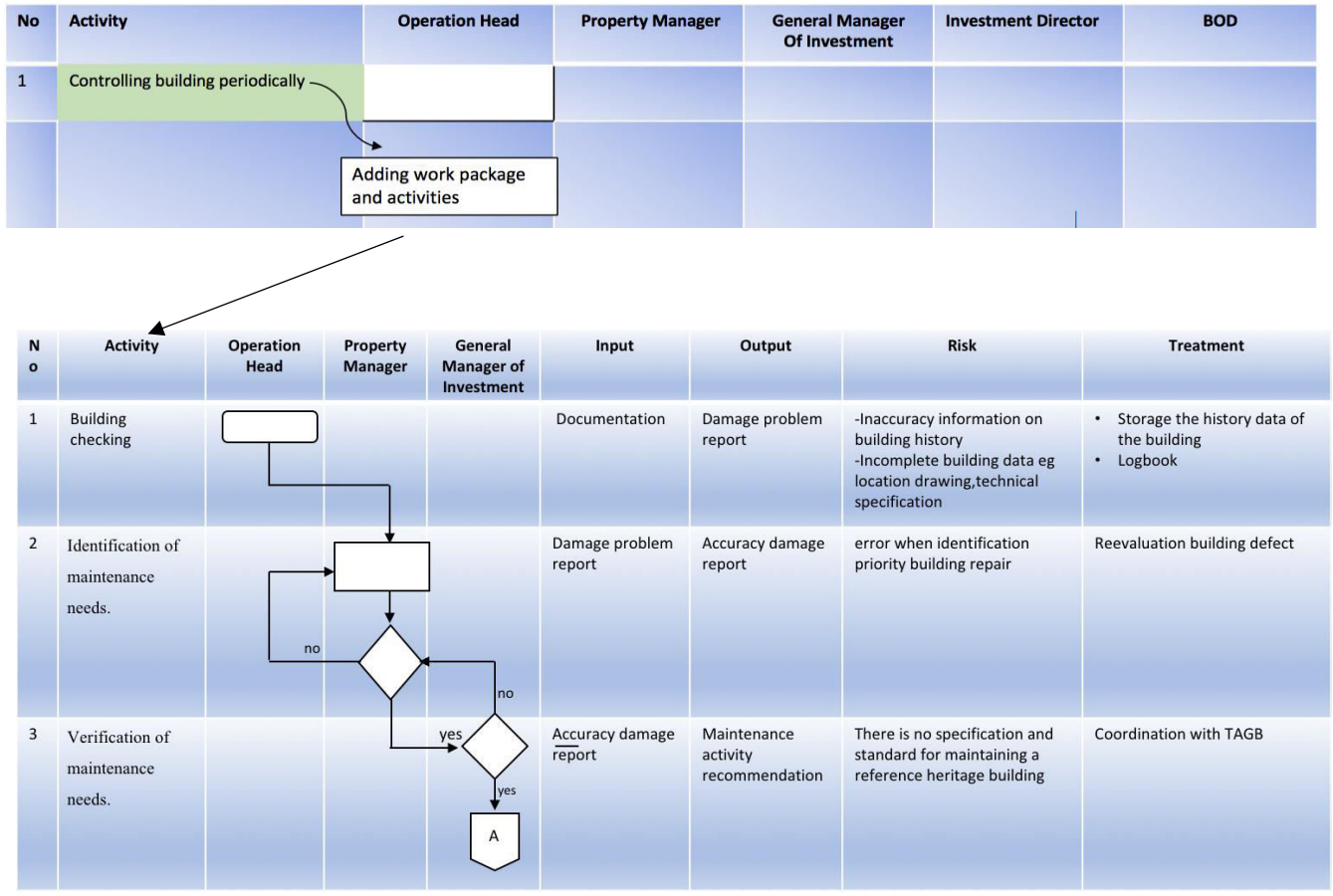
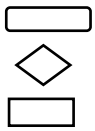


Figure 4. Example SOP in determining building status

Note:



: The start or end

: A Decision

: A Process

6. Conclusion

The purpose of this paper is to determine the activities, risks and Standard Operation Procedure on heritage building maintenance. This study utilizes the case-study appearance sequence to illustrates what the risks and the assessment methods are in the maintenance heritage building in Indonesia. Based on the risk analysis, 25 high risks were found. Preventive and corrective measures were taken to deal with risk. The risk-based SOP is developed and there is 6 SOP with 23 activities. The result occurred in accordance with ZA Akasah (2009 and 2010) in the research title "Analysis and Development of the Generic Maintenance Management Process Modelling for the Preservation of the Heritage School Buildings". This SOP useful for building management in carrying out historical building maintenance activities.

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