

International Conference on Engineering,  
Environment, Economic, Safety & Health

**10<sup>th</sup> SENVAR**

**1<sup>st</sup> CONVEEESH**

**International Seminar  
on Environment & Architecture**

Sam Ratulangi University  
Faculty of Engineering  
Manado - Indonesia



International Seminar  
on Environment & Architecture

International Conference  
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Economic, Safety & Health

# PROCEEDINGS

**1<sup>st</sup> 10<sup>th</sup> SENVAR  
CONVEEESH  
26-27<sup>th</sup> October 2009**



SAM RATULANGI UNIVERSITY  
FACULTY OF ENGINEERING  
MANADO - INDONESIA  
2009





## **Welcome Speech** **Rector of Sam Ratulangi University, Manado**

*Excellencies,  
Keynote Speakers, Prominent Researcher, Professors, Graduate Students,  
Distinguished Guests, Ladies and Gentlemen.*

Welcome to the International Seminar in Sustainable Environment and Architecture (10<sup>th</sup> SENVAR), and International Conference on Engineering, Environment, Economic, Safety and Health (1<sup>st</sup> CONFEEESH).

I am very pleased to be here to attend the opening ceremony of this event, and it is a great honor for the Sam Ratulangi University to host this a back-to-back event. As a rector, let me give you a brief introduction about Sam Ratulangi University. This university consists of eleven faculties including Medicine, Engineering, Animal Science, Fisheries and Marine Sciences, Economics, Law, Social and Political Sciences, Letters, Mathematics and Natural Sciences, and Public Health. We run various academic programs for undergraduate and postgraduate level. We have several research centres, and one of them is the centre for environment.

In order to increase the quality, we set up several programs which one of them is to increase cooperation and collaboration with international universities and other related institutions. Currently we have some collaborations with institution abroad, and looking forward to having more cooperation and collaborations with others.

As we know, SENVAR has been hosted at both Indonesia and Malaysia for ten times, while CONFEEESH is the first conference that is originally initiated by faculty of engineering, Sam Ratulangi University. CONFEEESH is a platform for dissemination on knowledge of engineering for better life involving aspect of environment, economics, safety and health. Obviously, these two events provide a common platform for discourse, and are proudly organised together as both have similar objectives and obsession.

This event has successfully brought together experts and professional in diverse disciplines that are striving to give answer to engineering for better life. I believe that this even will be



Chancellor of University of Sam Ratulangi, and the Dean of the Faculty of Engineering for gracing this event. Our appreciation also goes to corporate and individual sponsors for their support. Last but not least, I would like to thank the members of the organizing committee and other individuals for their commitment to make this event a success.

Thank you very much.

**Dr. Abdelnaser Omran Al-Amroni**

Co - Chairman

*Dr. Abdelnaser Omran is specialist in field of environmental engineering and management at the School of Housing, Building and Planning, Universiti Sains Malaysia. He is an avid writer, contributed many publication in environmental sciences, construction and project management.*





## **Welcome Speech Dean of The Faculty of Engineering Sam Ratulangi University, Manado**

I am very pleased to welcome all speakers and participants of the First International Conference on Engineering, Environment, Economic, Safety and Health (1<sup>st</sup> CONVEEESH) and the Tenth International Seminar on Environment and Architecture (10<sup>th</sup> SENVAR).

It is a great honor for us to organize and hold this very prestigious scientific event. As a leading Engineering Educational Institution in North Sulawesi Province, Faculty of Engineering Sam Ratulangi University always commits to be in the front line in the development of knowledge and technology. In facing the global challenge, this institution continues to improve itself by always developing and maintaining communication, networking and collaboration with various government and private institutions, profession organizations and other universities in country and overseas.

During 45 years since its establishment, Faculty of Engineering Sam Ratulangi University has produced more than 5000 graduates and currently has about 2500 students and 230 academic staffs distributed in four departments, Civil, Architecture, Electrical and Mechanical Engineering. This year, in the celebration of the 45<sup>th</sup> Anniversary of Faculty of Engineering Sam Ratulangi, we want to state again our commitment through a series of events with the theme 'Science and Engineering for Better Life', in which this International Conference and Seminar becomes one of the main programs.

I really appreciate the attendance of all speakers and participants from various institutions in country and overseas. I believe this conference and seminar will become a good forum for sharing information and experience, and with all your expertise I also believe that this forum could give significant contribution to the development of knowledge and technology that in turn could contribute to 'better life'.

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# Key Factors in the Model of Performance Assessment of Urban Drainage System

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## Abstract

*Flood and inundation which struck most of the cities in Indonesia almost every year happened due to the lack of function of the urban drainage as it is planned to be. This is because of, among others, the failure in the management of urban drainage as well as the reduction on the level of service of drainage network in line with the passing of time. Hence, the existing urban drainage network needs to be perfected which obviously requires much funding. A scale of priority is needed in the process of perfection to assess the present performance so that the lack can be identified. On the other hand, under the present condition in which the government finance is limited, a scale of priority is urgent in dealing with the existing network. To fulfill the need, there is the need to develop a model for performance assessment on the drainage system which in turn will be used by the government in making strategic decisions to set up priority scales in dealing with the drainage system. Nowadays, the Ministry of Public Work has had a Guidance for Performance Assessment for Local Government in the Field of Public Work (PKPD-PU, 2008) which is employed to assess the performance of Local Government in the field of Public Work per annum including the urban drainage. The Guidance has become a preliminary material and needs to be studied so as to be improved for the development of a model for a more comprehensive performance assessment of urban drainage system. Such an assessment will be very important in deciding the priority in dealing with the drainage system. In this paper, the study on the key factors and components which are measured in supporting the function of urban drainage will be focussed. The result will be measured components and key factors which have been perfected which in turn will be elaborated into indicators or parameters to be employed in assessing the performance of urban drainage system.*

**Keywords:** assesment, drainage, key factor, performance, urban

## 1. INTRODUCTION

Flood and inundation happens every year in most area of big cities in Indonesia. This flood and inundation have caused unfavorable losses to human and other creatures [1,2,3,4,5]. Generally, flood and inundation that caused unfavorable impacts to humans, show the failure of planning, designing, and management of flood and inundation. Therefore, measures need to be taken to perfect them.

Perfection in planning, designing, and managing flood and inundation needs certain tools in order to evaluate/asses the imperfection of planning, designing, and management of current flood and inundation. In the perfection process, a tool is needed to measure current performance, thus we are able to know the imperfection. The assessment result can also be used by government in making strategic policies to make priorities scale in current urban drainage system management [6].

Andayani dan Yuwono (2009) have identified factors that can be used as key factors in developing urban drainage system performance assessment [6], namely:

- a. Serviceability Factor.
- b. Maintenance Factor.
- c. Inundation Factor.
- d. Community Factor.
- e. Government Factor.



The identification was derived from drainage function related definitions, but those factors have not been developed further into urban drainage system performance assessment model. Currently the General Works Department already has a General Works Municipal Performance Assessment Guide (PKPD-PU, 2008) that is used to assess Municipal Government performance in General Works on each year including the assessment of urban drainage [7]. In this case, a study on those two needs to be made in order to generate more comprehensive key factors as input in the making of urban drainage system performance assessment model.

## 2 METHODS

The methodology used to generate more comprehensive key factors in order to make an urban drainage system performance assessment model is as follows :

- a. To study various factors that can be used as key factors in making the urban drainage system performance assessment model which is especially based on suggestions from Andayani and Yuwono (2009) and PKPD-PU (2008).
- b. To formulate more comprehensive key factors in making the urban drainage system performance assessment model.

## 3 RESULTS AND DISCUSSION

Based on Andayani and Yuwono (2009) suggestions and PKPD-PU (2008) shown in Table 1, a study can be made in order to generate more comprehensive key factors in the making of an urban drainage system performance assessment model.

**Table 1.** Study on key factors in making an urban drainage system performance assessment model

PKPD-PU (2008)	Andayani dan Yuwono (2009)	Follow ups
Regulation, Administrator, Human Resources, Planning , Document, Reporting	Government factor (law establishment, maintenance, construction)	Needs in-depth study on what key factors that are related with government factor through questionnaire distributed to respective experts
Society and private active roles, society involvement planning	Community factor (land function alteration, trash disposal, maintenance)	Needs an explanation on society roles and its size in order to discover roles and their impacts on urban in drainage performance
Drain physical factor ( Drainage channell, Drainage building, Complimentary building, Pump house and its equipment	Serviceability factor (anything related to level, service)	Needs more details on things related to urban drainage channel, how to measure it and its impact on urban drainage
Functioning of drain and drainage building	Inundation factor (width, height duration, loss frequency)	Needs deeper study, whether key factors should be focused on building functions instead on the inundation as a result of a non-functioning building
Operation and maintenance implementation	Maintenance factors (routine, periodic, repair, replacement treatment)	Needs deeper study on how to measure operation and maintenance performance

According to the above table 1, it can be seen that between the suggestions from Andayani and Yuwono (2009) and PKPD-PU (2008) have mostly cover the same factors, but then the details of those factors are different because of different perspectives. Andayani and Yuwono (2009) acquired the key factors from drainage definition study, while PKPD-PU (2008) are used to assess supervision performance carried out by municipal government. Certainly, these two perspectives are good enough, therefore they need to be more explored through more comprehensive study involving experts in society and urban drainage planning and management. A formulation on how to measure government role in law upholding, regulation, organization, and their impacts on urban drainage system performance needs to be generated for the government factor. In relation to community factor, how to measure society active role in planning, trash management, land alteration function, and their impacts on urban drainage system performance. As for the serviceability factor, further identification is needed on roles and measures to assess each building and their components and the impacts on

urban drainage system performance. While in inundation factor, a deeper study is needed on whether the factor is focused on the functioning of buildings or on inundations as a result of non-functioning of buildings. While related to maintenance factor, a deeper study is needed on whether the factor shall be focused solely on maintenance or along with the operation as well. Therefore, in the making of an urban drainage system performance model, various of deeper studies and researches related to details of each factor, how to measure them, and the needs of verification from various experts in planning, maintenance, and good society which directly or indirectly affected by the failure of urban drainage system. Further process that is still needed after key factors have been identified is the formulation of an urban drainage system performance assessment model. In formulating this performance assessment model, at least a study of various kinds in existing Multi Attribute Decision Making to choose the one that fits most for this urban drainage system performance assessment. The final step is to formulate follow up activities from the assessment result from the urban drainage system performance assessment model in prioritizing the perfection handling of urban drainage system in order to achieve the desired performance.

#### 4 CONCLUSION

Studies on literatures that have been carried out relating to the making of urban drainage system performance assessment model have shown that the identified factors are not fit enough if they were about to be used as key factors in urban drainage system performance assessment model. Key factors like Serviceability Factor, Maintenance Factor, Inundation Factor, Community Factor, and Government Factor indeed can be used as the foundations in formulating the model, but then the details of those factors need more comprehensive studies and surveys involving various experts from drainage planner, administrator, and the general community. The next step would be to formulate those key factors into an urban drainage system performance assessment model by first conducting studies on various kinds in Multi Attribute Decision Making to generate the kind most suited for the desired performance assessment [8]. The final step, in order for this model to be useful in improving the current drainage system performance, is to formulate follow up activities from the result generated from this assessment model in order to set priorities for the perfection of urban drainage to reach the desired performance.

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