

## Application of Green Construction in Construction of the Bayung Lencir Toll Road

Rahmat<sup>1\*</sup>, Prima Zola<sup>2</sup>

<sup>1</sup> Civil Engineering, Universitas Bung Hatta, Indonesia

<sup>2</sup> Civil Engineering, Universitas Negeri Padang, Indonesia

\*Corresponding Author, e-mail: [rahmatalifiardi@bunghatta.ac.id](mailto:rahmatalifiardi@bunghatta.ac.id)

Received 6<sup>th</sup> March 2025; Revision 23<sup>th</sup> March 2025; Accepted 30<sup>th</sup> March 2025

### ABSTRACT

*The implementation of Green Construction in infrastructure projects aims to reduce negative impacts on the environment and increase resource efficiency because every construction project must have a negative impact on the environment, so the implementation of Green Construction is needed to reduce the negative impacts of construction activities. This study analyzes the implementation of the Green Construction concept in the construction of the Bayung Lencir - Tempino Toll Road Section 1. The research method includes collecting primary data through field observations and interviews with contractors and secondary data from various scientific references. The results of the study indicate that the implementation of Green Construction in this project includes energy efficiency, water conservation, environmental management, and the use of environmentally friendly materials. However, there are several obstacles in its implementation, such as technological limitations, lack of specific regulations, lack of stakeholder awareness, and limited funding for the use of environmentally friendly equipment. To overcome these challenges, stronger policy support, investment in green technology, and increased awareness and skills of the workforce related to Green Construction are needed. With more optimal implementation, this concept can be a sustainable solution in infrastructure development in Indonesia*

**Keywords:** Green Construction; Toll Roads; Sustainable Infrastructure; Resource Efficiency; Environment.

Copyright © Rahmat, Prima Zola

This is an open-access article under the: <https://creativecommons.org/licenses/by/4.0/>

DOI: <https://doi.org/10.24036/cived.v12i1.463>

### INTRODUCTION

The development of Green Construction is currently growing due to awareness of the importance of the natural environment which is decreasing due to the opening of new land, illegal logging, and activities that have the potential to damage nature, one of which is construction. Green Construction is highly developed in minimizing the damage that has occurred and at the same time as a way to renew the various damages that have occurred. Development policies based on the pillars of sustainability, namely social, economic and environmental, have succeeded in encouraging the implementation of environmentally friendly toll road infrastructure development.

Construction projects are complex and unique endeavors that have no similarities with previous projects, therefore construction project management is very important in every construction project. A construction project is a series of activities that are carried out only once and generally have a short time span. In addition, construction projects also have characteristics that are unique, require resources (manpower, materials, machines, money, methods) and require organization (Ervianto, 2005).

The definition of Green Construction according to an expert named Glavinich in (2008) is that a planning and implementation of the construction process is based on contract documents to minimize the negative impact of the construction process on the environment so that there is a balance between environmental capabilities and human life needs for current and future generations.

Ervianto (2009) stated that the concept of Green Construction includes things that are grouped into several aspects of green construction which include: Appropriate land use, Energy efficiency and conservation, Water conservation, Building environmental management, Material sources and cycles, Health and comfort in the project environment and Air quality aspects.

## **METHOD**

This research was carried out on the Bayung Lencir Toll Road Construction Project which is located in Senawar Jaya Village, Bayung Lencir District, Musi Banyuasin Regency, South Sumatra Province. Primary data and secondary data are two types of data used in research.

There are 2 data collections in this research, namely

a. Observation

Observation is a method. data collection that involves direct observation of the subject or phenomenon being researched in the field. Pe.ne.liti actively observes and records information about behavior, interactions, or events that occur naturally. Observation can be participatory, where the researcher is involved in the situation being observed, or non-participatory, where the researcher is only an observer. Observation can provide in-depth insight into the behavior and context of the research subject. Observations or direct field visits were carried out by the writer while the writer was carrying out practical work for two months at the research location, namely the Bayung Lencir Toll Road Project.

b. Interview

Interview is a method. data collection that involves direct interaction between researchers and respondents. The researcher asks a series of questions to the respondent with the aim of obtaining in-depth information about their views, experiences, opinions or knowledge related to the research topic. Interviews can be structured, with pre-determined questions, or unstructured, where the conversation takes place more freely. Interviews are often used to obtain more comprehensive and in-depth views from respondents. Interviews also aim to obtain information about the research being researched. The writer conducted interviews with contractors in the field and via WhatsApp, because at the time this research had not yet been completed, the toll road construction project had already been completed so that many workers were no longer at the location of the Bayung Lencir toll road construction project.

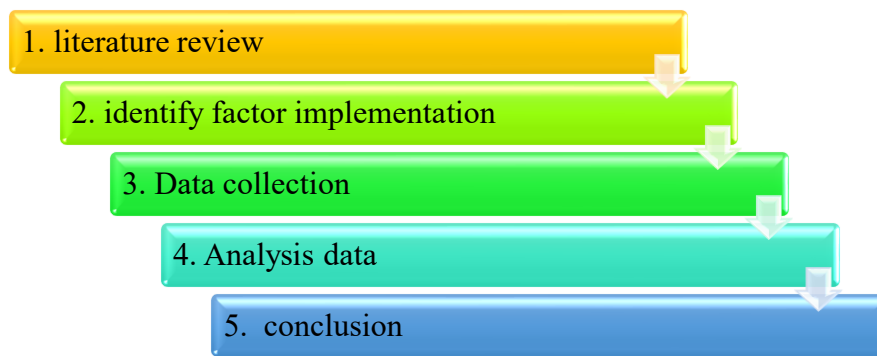


Figure 1. Step in methodology

## RESULTS AND DISCUSSION

Green construction is a shortening in development that emphasizes sustainability and resource efficiency throughout the building's life cycle. This concept aims to minimize negative impacts on the environment and improve the quality of life of residents

Green construction development faces various challenges that can hinder its implementation. Based on the results of research and analysis, the following are some of the main inhibiting factors in the implementation of green construction concepts:

### A. Technology

One of the factors inhibiting the implementation of the Green Construction concept is the limited technology that supports the Green Construction concept itself, for example the following:

- a) Use of alternative fuel.  
The fuel used is still the fuel that is normally used. There is no special fuel to carry out Green Construction on a project.
- b) Recycling technology  
In the USE.PA study in 1998, the amount of waste produced as a result of development and destruction in America was more than 135 million tons, in several projects materials that could be recycled, such as wood, concrete, red brick, reached 75% of the total waste. Various types of waste are produced from building components such as doors, lighting accessories, packaging materials, materials, various materials and various kinds of construction waste, such as bottles, various types of paper and paper.
- c) Limited access to environmentally friendly equipment  
The limited availability of environmentally friendly equipment is one of the factors inhibiting GreeN Construction's implementation because the tools and equipment it provides still use equipment that is generally used in construction projects.

### B. Owner's Active Role

One of the second inhibiting factors is the active role of the Owner, so in order for it not to become an inhibiting factor in Green Construction, an owner must fulfill several requirements, including, requiring the use of wood whose origin can be accounted for, creating a system for soil infiltration, the determination of water filtration that will be channeled into the ground, not cutting down trees except inside buildings, responsible use of clean water, monitoring waste produced, monitoring noise, vibrations, and groundwater conditions due to the project, monitoring air quality during the project to create clean air.

- C. Limited regulations that specifically regulate the implementation of Green Construction  
The next inhibiting factor is the lack of regulations that regulate specifically the implementation of Green Construction concepts such as, for example, standardization related to appropriate lighting for construction activities both indoors and outdoors, the use of low-emission and low-fuel construction equipment efficiency
- D. Socialization of water conservation, energy, use of light sensors, not using dangerous substances such as mercury and Styrofoam which are not environmentally friendly. This socialization is very necessary because of the importance of understanding about Green Construction to all aspects starting from the owner, contractor to the aspects of society itself. Therefore, socialization about Green Construction is often carried out to support the success of Green Construction's business.
- E. Funding intervention in terms of rejuvenation of various equipment with low emission and fuel efficiency. Funding to renovate various equipment is also very important because it can have an impact on health and air quality. Because if this rejuvenation is done routinely, it can save fuel consumption and also reduce emissions produced by the tools used in the field.

## CONCLUSION

The Bayung Lencir Toll Road Construction Project has implemented many of the concepts of Green Construction, of which the terse.but implementations are land use, efficiency and environmental conservation, water conservation, building environmental management, resources and material cycles, and health and comfort in the project environment.

The main obstacles to green construction implementation in the Bayung Lencir Toll Road Construction Project are expensive costs, the lack of tools that use environmentally friendly energy, and the lack of knowledge and experience of expert staff. The smaller the obstacles encountered in the Bayung Lencir Toll Road Construction Project, the greater the level of progress for construction.

In the Bayung Lencir Toll Road Construction Project, several factors were still found that did not indicate the implementation of the construction concept, such as turning on the lights during the day, air conditioning temperature that was too low, and the power inside. using air conditioning, dust due to construction, felling of trees, damage due to land quarries, and reduced water catchment. In the Bayung Lencir Toll Road Construction Project, even though there are several factors that violate the construction concept. However, this project has ways to reduce the impact of damage. Such as replanting trees (reforestation), watering project locations which aims to reduce dust emissions and make the air around the construction site healthy.

## REFERENCE

- [1] Afiq, M., & Nurdiana, A. (2024). Analisis Manajemen Risiko Pada Pelaksanaan Pembangunan Bangunan Hijau Di Kota Semarang. Jurnal Syntax Admiration, 5(6), 2322-2329.
- [2] Arifin, A. (2014). Inve.Stigasi Faktor Hambatan Dalam Mengembangkan Green Building di Daerah Istimewa Yogyakarta (Doctoral dissertation, UAJY).
- [3] Astuti, Zulaikha Budi., & dkk. (2022). Jalan Tol Hijau Berkelanjutan. Sekretariat Pengatur Jalan Tol: Jakarta

- [4] Dannyanti, E. (2010). Optimalisasi pelaksanaan proyek dengan metode. PERT dan CPM. Semarang. Universitas Diponegoro.
- [5] E.rvianto, W. I. (2012). Selamatkan Bumi Melalui Konstruksi Hijau. Perencanaan, Pengadaan, Konstruksi & Operasi, Yogyakarta.
- [6] Firmawan, Ferry, & dkk. (2024). Imple.me.ntasi Green Highway Pada Jalan Tol Semarang-Demak Seksi 2. Program Studi Teknik Sipil Universitas Semarang: Semarang.
- [7] Isya, M., Rani, H. A., & Utama, F. P. (2019). Effe.ct of green road concept on waste. manageme.nt on road construction in the. Banda Aceh city. In IOP Confe.re.nce. Series: Mate.rials Science. and E.ngineering (Vol. 469, No. 1, p. 012061). IOP Publishing.
- [8] Lovina, R. (2023). Kajian Pembangunan Infrastruktur (Jalan, Jaringan Listrik, Telekomunikasi) Yang Disinergikan Dengan Pembangunan Jalur Hijau Di Kota Tanjungpinang. Jurnal Archipe.lago, 2(02), 181-193.
- [9] Maulidianti, Nur Asriani., & dkk. (2020). Identifikasi Konsep Green Construction Pada Pelaksanaan Gedung Perpustakaan Pusat Universitas Tanjungpura. Jurusan Teknik Sipil Fakultas Teknik Universitas Tanjungpura: Pontianak.
- [10] Ningrum, D. A., Siagian, T. S., & Rasyid, M. A. (2024). The. Green Construction Model in the. Construction Industry to Support a Sustainable. Green Economy Jurnal Ekonomi, 13(01), 91-106.
- [11] Nurul, Fatimah. (2016). Analisis Kesesuaian Penerapan Green Construction Menurut Kontraktor di Surakarta. Universitas Sebelas Maret: Semarang.
- [12] Radityo, B. T. (2012). Preferensi Masyarakat Terhadap Jenis Tanaman di Kawasan Pemukiman Sekitar Kampus (Studi Kasus Di Padukuhan Karanggayam, Desa Caturtunggal, KeCamatan Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta).
- [13] Raghe.b, Amany., & dkk. (2016). Green Architecture: A Concept of Sustainability. Departme.nt of Architectural Engineering Pharos University Alexandria 21311: Mesir.
- [14] Sisdianto, E.. (2024). Implementasi Audit Sosial Lingkungan Dalam Proyek Infrastruktur: Studi Kasus Jalan Tol Berbasis Hijau. Jurnal Intelek Dan Cendikiawan Nusantara, 1(6), 9131-9141.
- [15] Sudarsana, D. K., Wicaksono, A., Sulistio, H., & Djakfar, L. (2015). Road Re.Construction Work Zone Management Toward A Green Construction Concept. Jurnal HPJI (Himpunan Pengembangan Jalan Indonesia).
- [16] Tjusanto, F. (2013). Studi Mengenai Dampak Penerapan Manajemen Keunggulan Proyek Terhadap Kesuksesan Proyek Konstruksi (Doctoral dissertation, UAJY).
- [17] Umum, M. P. (2012). Pedoman Penanaman Pohon Pada Sistem Jaringan Jalan. Menti Pekerja Umum.