ABSTRACT

HAIRUL SITEPU, Developing Green Building Rumah Susun Sederhana Sewa (Rusunawa) Model by Optimazing Green Construction, under the supervision of Bambang Pramudya as a chairman, Aris Munandar, Etty Riani and Rinekso Soekmadi as members respectively.

The vertical storeyed houses policy has been an important policy since the growth of population and the scarcity of the landed houses in the city. Vertical houses for middle-up class people are known as Rumah Susun Sederhana Milik (Rusunami) or Simple Storeyed Owned Houses while vertical houses for lower income class people are called Rumah Susun Sederhana Sewa (Rusunawa). Rusunawa development utilizes a lot of natural resources as the construction materials which impact to depletion of nature. The objective is to set up the policy of green Rusunawa development utilizing green construction through the identification/research of building materials that are potentially causing negative impacts to the environment, key factors and actors as well as the alternatives in the construction accomplishment to obtain its optimum.

A Rusunawa building is built of concrete. There are three alternatives in the construction, system conventional, semi pre-cast, and pre-cast way. This research starts with the calculation of using of building materials for each alternative continued with the analysis of the environmental impact in utilizing natural resources that are produced, utilized and recycled. The tool that is used to analyze is Life Cycle Assessment (LCA) using the SimaPro 5.0 software. The result of the single score of the conventional LCA shows that iron is the largest impacting element (8,19 kPt), followed by cement (4,55 kPt). LCA semi pre-cast, shows that cement is the largest impacting element (4,7 kPt), followed by iron (3,59 kPt) while LCA pre-cast shows concrete iron is the largest contributor of impact (6,81 kPt), followed by cement (3,82 kPt). Almost all of the elements potentially result in 3 dominant impact categories, (1) chronic content of poison in water environment; (2) acute content of poison in water environment and (3) chronic content of poison in land environment. The total impact of the environment in using building materials in conventional construction is 18,6 kPt and could be reduced to 13,8 kPt by using pre-cast and is able to be reduced more to 13,0 kPt by using semi pre-cast.

Besides the potential environment impact it caused, this research also found out that the usage of construction energy for the pre-cast concrete system is less, merely 806,981 KWH, in comparison to the conventional system which is 1,253,774 KWH and the pre-cast system is 1,008,199 KWH for each twin-block Rusunawa. The LCA research data and energy are forwarded to the experts to obtain inputs through the Analyses Hierarchy Process (AHP) approach, with the result that the construction accomplishment alternative utilizing semi pre-cast concrete is able to maintain the environment quality through regulating the government policy in respect to the green Rusunawa development. Further more, through the Interpretative Structure Modeling (ISM), it is discovered that with regard to the semi pre-cast concrete development, the dominant actor is the Ministry of Public Housing (Kemenpera) with the potential obstacle of development recognized to be in its socialization and draw backs of Human Resources. The development of semi pre-cast concrete system has the ability to save wood logs of 398,021 M3 or equal to 6,636 Hectares of forest area in 2010, increasing to 1,899,819 M3 of wood logs or equal to 31,496 Hectares of forest area in 2030, merely for the development in Batam.

Key words: LCA, AHP, ISM, element, impact, material, pre-cast, energy, AHP, ISM

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