

SOCIAL AND SAFETY ELEMENTS IN GREEN HIGHWAY INDEX

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This is for Dr. Rozana Binti Zakaria and Mohd Firdaus Bin Mohamed.

One owns my mind while the other owns my heart.

Thank you

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No manual say I need to do it conventionally: p

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ABSTRACT

A Green Highway is an inspiration for the infrastructure to be environmentally responsible and sustainable in all aspect. It is expected to be eco friendly and significantly will reduce the emission of carbon dioxide and other green house gases. To achieve green highway standard, focus should now be on harmonizing highway needs with local ecological protection consideration. How to avoid subsequent environmental destruction and excessive resource consumption? How to incorporate sustainable development concepts into highway projects? The need for promoting sustainability and green highway construction requires an assessment system. Green highway rating provides an update current version of highway management practices. Nevertheless, the social and safety factor are often than not, been reduce significantly and in some cases is not being addresses critically. The aim of this study is to identify the adequacy and the appropriateness of social and safety element to be included in green highway criteria and therefore to be utilised in Malaysian Green Highway Index and its assessment. Data were obtained through comprehensive literature review, experts' interviews and distribution of questionnaires. The outcomes from the interview were analysed qualitatively. Average Index Value analysis have also been utilised for the result of the questionnaire. The study resulted in 7 main criteria and 12 sub criteria have been accepted to be used for green highway index assessment.

ABSTRAK

Lebuhraya Hijau merupakan satu inspirasi untuk infrastruktur yang bertanggungjawab terhadap isu alam sekitar dan kelestarian. Lebuhraya hijau dijangka untuk menjadi mesra alam dan mampu mengurangkan pelepasan gas karbon dioksida dan gas rumah hijau yang lain secara ketara. Pengharmonian keperluan lebuhraya dengan perlindungan alam sekitar perlu diberi fokus untuk mencapai standard lebuhraya hijau, Apakah cara untuk mengelakkan kemusnahan alam sekitar, penggunaan sumber alam yang melampau? Apakah cara untuk menggabungkan konsep pembangunan kelestarian dalam projek lebuhraya? Sistem penilaian adalah perlu dalam usaha mempromosi kelestarian dan pembinaan lebuhraya hijau. Penarafan lebuhraya hijau menyediakan praktis pengurusan lebuhraya yang paling terkini. Walaubagaimanapun, isu sosial dan keselamatan selalunya tidak diambil berat dan kadangkala, tidak diberi perhatian secara kritikal. Tujuan penyelidikan ini adalah untuk mengenalpasti kesesuaian dan kecukupan penglibatan isu sosial dan keselamatan sebagai kriteria dalam lebuhraya hijau dan seterusnya digunakan dalam indek dan penilaian lebuhraya hijau. Data diperolehi melalui kajian literatur yang komprehensif, wawancara bersama pakar dan pengagihan borang kaji selidik. Hasil wawanca telah dianalisis secara kualitatif. Analisa purata nilai indek (*Average Index Value*) juga digunakan untuk menganalisis hasil daripada borang kaji selidik. 7 kriteria dan 12 sub kriteria telah diterima dan akan digunakan dalam indek lebuhraya hijau.

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CHAPTER 1

INTRODUCTION

1.1 Preface

The direction of this project is discussed in detail; problem statements, aim and research objectives, scope of the study, brief explanation of the methodology conducted and the expected findings. The rationale of the selection of the study area also is been emphasized.

1.2 Research Background

During United Nation Conference on Environment and Development in Rio Janeiro 1992, a need for sustainable development has been acknowledged. One major blueprint on how the world's nation can work individually and collectively towards sustainable development was documented under the name Agenda 21 which has been endorsed by more than 150 nations (Ger Herbert,2001). Construction industries play a major role to achieve sustainable development. A Green Highway is

an inspiration for the highway infrastructure to be environmentally responsible and sustainable in all aspect. It is expected to be eco friendly and significantly will reduce the emission of carbon dioxide and other green effect gases. The green highway concept requires huge amount of attention from all road shareholders including concession, drivers and authorities to make it successful. To achieve green highway standard, focus should now be on harmonizing highway needs with local ecological protection consideration, how to avoid subsequent environmental destruction and excessive resource consumption and how to incorporate sustainable development concepts into highway projects. The need for promoting sustainability and green highway construction requires a green highway assessment system. Green highway rating provides an update current version of highway management practices. The system classifies various parts of highway construction processes and then rates them based on their environmental sustainability. A green highway can be defined by five broad topics, each of which includes various aspects. (James M. Bryce, 2008) It's incorporate of watershed driven storm water management, life cycle energy and emissions reduction, recycle, reuse and renewable, conservation and ecosystem management and overall societal benefits. He believed that sustainability has been defined as a tool focused on the natural environment and effects on the man-made environment have been overlooked. However, in a holistic approach to sustainable construction, overall societal benefits should be taken into account. Highways have an important impact on local economies. An aesthetically appealing highway design can draw business into a community and supply local jobs and tax income, whereas a poorly designed highway can decrease traffic to a business and eventually cause the business to seek a better location.

1.3 Problem Statement

Highway is the principal infrastructure and main element for economic development of one country. It is roads that connect towns to towns and cities to cities. The construction of the highway normally involves massive earthwork such as

cutting the hilly area, backfilling low lying area, crossing on the wetland, reliance on non-renewable energy and generation of harmful emission. Malaysia set an agenda to produce extensive infrastructure, among which is vast network of highways. In 2000, the total length of roads in Malaysia was approximately 65,445km. The total length of roads is increased by 33 per cent from 2000 to 2005. From 2005 to 2007, the length of roads increased by 35 percent (LLM, 2010). According to Malaysia Highway Authority, there are altogether 29 highways in Malaysia with total length of 1 732.44 km. J.M. Belton *et.al* (2008) stressed that highway should be constructed as one social responsibility element. However, the overall process of such construction will also produce huge amount of tangible and intangible waste that most than not bury the benefit of constructing a highway. Highway that have been build along with the theme sustainable can control the quantity of waste produced which will then ultimately fulfil the requirement of social sustainability principle. Globally, researchers and road stakeholder search for the characterisation of green highway element. This later translated as numerous green highway models and standard that ultimately defines the ‘greenness’ of one highway. Virtually, every single assessment model of green highway is different from one another. This is because each model is generally designed and built base on local capacity in particular regions which covers local needs. This problem might be contributed by different elements of weightage used in every single model. There is no standardization between models of assessment as they come out with their own interpretation. Nevertheless, the social and safety factor are often than not, been reduce significantly and in some cases is not being address critically.

1.4 Aim of the study

The aim of this study is to identify the adequacy and the appropriateness of social and safety element to be included in green highway criteria and therefore to be utilised in Malaysian Green Highway assessment.

1.5 Objectives

- i. To study social and safety sustainability aspect in green highway development.
- ii. To classify criteria and sub criteria of social and safety sustainability for green highway.
- iii. To identify social and safety sustainability elements which are suitable and appropriate for Malaysian green highway index.

1.6 Research Scope

This research determines the social and safety element in green highway index. Comprehensive literature study of numerous green development manual are been carry out, the comparison of each element in the respective manuals and standard are been listed. After the inventory, semi constructed interviews and questionnaires survey will be conducted around different highway stakeholders (i.e.: concession companies, green development corporation). Several parties from government and private sectors will be approached to take their views, perceptions and suggestions towards the problems. The scope is mainly of the new construction of green highway in design stage. Input from each respondent will be analysed through assessment tool in order to justify the relevant aspect that can be constituted as social and safety sustainability part.

1.7 Brief Research Methodology

The detail research methodology will be explained further in Chapter 3, the research stages will cover as follows:

i) Preliminary Stage of Study

The research methods used for this study purpose are the review of literatures including books, journals and information from Internet.

ii) Data Collection and Analysis

Semi - Structured interview and distributing questionnaires within the selected parties are the methods for data gathering. It is important to know the experiences and individual preferences who are involved with the highway and building construction.

iii) Conclusion Stage

Based on the data obtained from the analysis, some recommendation has been made for further action. The recommendations are discussed in Chapter 5.

1.8 Expected Findings

The research is expected to illustrate the existence of social and safety sustainability in green highway manuals and models and suitability for Malaysia Green Highway Index. This will be tabulated in a table showing the criteria and the references from various green highway manuals and models. Next, classification of

criteria and sub criteria of social and safety sustainability elements in existing green manuals and models shall be determined by developing a matrix that shows the element of social and safety factors. Finally, the suitable element and sub element of social and sustainability factor will be categorised.

1.9 Significant of the Study

As highlighted, the need for green highway index, especially one that developed locally is crucial for the purpose of constructing actual green highway. A system is required to identify all the elements that have been recognised globally as parts of green highway. However, since most standards and manuals failed to expand the social and safety element more than just in the surface even though researches have proved that public safety and relationship element are crucial in developing a sustainable highway.

Thus, through the findings of the study, it is hoped that the responsible parties to take into consideration the social and safety element in the process of creating green highway index in Malaysia. It is also expected that this study will assist the responsible parties and road stake holder to have a more conceptualised framework during the design stage of green highway construction.

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