

STUDY ON COMPARATIVE FLEXIBLE PAVEMENT THICKNESS ANALYSIS USING VARIOUS DESIGN METHOD

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Abstract

Recently, there is a lot of variability in guide to design a pavement. Although all kinds method available, but still pavement suffers damage caused by unsuitable thickness. It is critical to determine the most appropriate pavement thickness for a given traffic level and subgrade condition. To overcome the problems, there is a need to study the comparative pavement thickness analysis using various pavement design methods so that it will be cost effective and long lasting. The input parameters in flexible pavement design are identified and have been used in obtaining different pavement layer thickness by conducting various pavement design method, that is Arahan Teknik (Jalan) 3/83 Jabatan Kerja Raya (JKR), AASHTO Method and Asphalt Institute Thickness Design Program (SW-1). Finding from this study indicate that thickness from Arahan Teknik (Jalan) 3/83 Jabatan Kerja Raya (JKR) gave better results than the others because it produced more thinner flexible pavement layer compared to the two other design method. In terms of cost, it will be more cost effective since the cost of material can be reduced.

Keywords: Flexible Pavement, AASHTO and Asphalt Institute Thickness Design

1. INTRODUCTION

The purpose of a pavement is to carry traffic safely, conveniently and economically over its extended life. The pavement must provide smooth riding quality with adequate skid resistance and have adequate thickness to ensure that traffic loads are distributed over an area so that the stresses and strains at all levels in the pavement and subgrade are within the capabilities of the materials at each level. The performance of the pavement therefore related to its ability to serve traffic over a period of time. From the day it is opened to traffic, a pavement will suffer progressive structural deterioration. It is possible that the pavement may not fulfill its intended function of carrying a projected amount of traffic during its design life, because the degree of deterioration is such that reconstruction or major structural repair is necessitated before the end of the design life. There are two main types of failure, functional and structural, associated with pavement deterioration. Functional failure is that wherein the pavement is unable to carry traffic without causing discomfort to the road users. This failure depends primarily upon the degree of surface roughness. Structural failure, on the other hand, indicates a breakdown of one or more component making it incapable of sustaining the loads imposed upon its surface. In flexible pavements, this failure may result from bituminous surface fatigue, consolidation, settlement, and shear developing in the subgrade or inadequate performance of the subs, road base, and surface, as a result of inadequate pavement thickness.

2. LITERATURE REVIEW

2.1 Flexible Pavement

Flexible pavements are those which are surfaced with bituminous (or asphalt) materials. These types of pavements are called "flexible" since the total pavement structure "bends" or "deflects" due to traffic loads. A flexible pavement structure is generally composed of several layers of materials which can accommodate this "flexing". Flexible pavements comprise more than 90 percent of our paved roads.

There are many different types of flexible pavements. It covers three of the more common types of Hot Mix Asphalt (HMA) mix types commonly used. Other flexible pavements such as bituminous surface treatments (BSTs) are considered by most agencies to be a form of maintenance and are thus covered under maintenance and rehabilitation. HMA mix types differ from each other mainly in maximum aggregate size, aggregate gradation and asphalt binder content or type. Guides are available on dense-graded HMA in most flexible pavement sections because it is the most common HMA pavement material. (HAPI, 2002). components makes it incapable of sustaining the loads imposed upon its surface. In flexible pavements, this failure may result from bituminous surface fatigue, consolidation, settlement, and shear developing in the subgrade or inadequate performance of the subs, road base, and surface, as a result of inadequate pavement thickness.

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Table of Contents Study On Comparative Flexible Pavement Thickness Analysis

1. Understanding the eBook Study On Comparative Flexible Pavement Thickness Analysis
 - The Rise of Digital Reading Study On Comparative Flexible Pavement Thickness Analysis
 - Advantages of eBooks Over Traditional Books
2. Identifying Study On Comparative Flexible Pavement Thickness Analysis
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Study On Comparative Flexible Pavement Thickness Analysis
 - User-Friendly Interface
4. Exploring eBook Recommendations from Study On Comparative Flexible Pavement Thickness Analysis
 - Personalized Recommendations
 - Study On Comparative Flexible Pavement Thickness Analysis User Reviews and Ratings
 - Study On Comparative Flexible Pavement Thickness Analysis and Bestseller Lists
5. Accessing Study On Comparative Flexible Pavement Thickness Analysis Free and Paid eBooks
 - Study On Comparative Flexible Pavement Thickness Analysis Public Domain eBooks
 - Study On Comparative Flexible Pavement Thickness Analysis eBook Subscription Services
 - Study On Comparative Flexible Pavement Thickness Analysis Budget-Friendly Options

6. Navigating Study On Comparative Flexible Pavement Thickness Analysis eBook Formats
 - ePub, PDF, MOBI, and More
 - Study On Comparative Flexible Pavement Thickness Analysis Compatibility with Devices
 - Study On Comparative Flexible Pavement Thickness Analysis Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Study On Comparative Flexible Pavement Thickness Analysis
 - Highlighting and Note-Taking Study On Comparative Flexible Pavement Thickness Analysis
 - Interactive Elements Study On Comparative Flexible Pavement Thickness Analysis
8. Staying Engaged with Study On Comparative Flexible Pavement Thickness Analysis
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Study On Comparative Flexible Pavement Thickness Analysis
9. Balancing eBooks and Physical Books Study On Comparative Flexible Pavement Thickness Analysis
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Study On Comparative Flexible Pavement Thickness Analysis
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Study On Comparative Flexible Pavement Thickness Analysis
 - Setting Reading Goals Study On Comparative Flexible Pavement Thickness Analysis
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Study On Comparative Flexible Pavement Thickness Analysis
 - Fact-Checking eBook Content of Study On Comparative Flexible Pavement Thickness Analysis
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements

- Interactive and Gamified eBooks

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