EFFECTS OF RH-WMA ADDITIVE ON THE RHEOLOGICAL PROPERTIES OF RECLAIMED ASPHALT BINDERS AND THE ENGINEERING PROPERTIES OF RECYCLED MIXTURES

LILLIAN @ LILIA GUNGAT

UNIVERSITI SAINS MALAYSIA

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by

LILLIAN @ LILIA GUNGAT

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I would like to dedicate this thesis to my beloved husband, Teo Jeck Hoe for his unconditional love and moral support, to my parents for their prayer and encouragement and also to my lovely children Clement, Adriel and Sarah Elina for all your patience and support during mommy's Ph.D studies.

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Keep your eyes on the stars, and your feet on the ground

Theodore Roosevelt

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LIST OF SYMBOLS

E_{α}	Activation Energy
RAP_{bc}	Binder Content of RAP Binder
G_{sb}	Bulk Specific Gravity of Aggregate
G_{mb}	Bulk Specific Gravity of Compacted Specimen
G*	Complex Modulus
η^*	Complex Viscosity
ωc	Cross Over Frequency
$\Delta\theta$	Difference Between the Ambient Temperature and Mixing Temperature
ω	Frequency
Y_j	Fitted Value of The Response
G_g	Glassy Modulus When $\Omega \rightarrow \infty$
ITS	Indirect Tensile Strength
d_j	Individual Desirability Function For Response Number J
η_{∞}	Infinite Viscosity
G'	Loss Modulus
MQ	Marshall Quotient
m_i	Mass Of Material Type *I*
$max\ f_j$	Maximum Actual (Experimental) Value of Response

min f_j	Minimum Actual (Experimental) Value of Response
J_{nr}	Non-Recoverable Creep Compliance
n	Number of Responses Included in the Optimization
D	Overall Desirability Function (Geometric Mean of the Individual Desirability Functions)
R	Percent Recovery
$RAP_{binder,mix}$	Percentage of RAP Binder in the Total Binder of a Mixture
RAP_{agg}	Percentage of RAP Aggregate in the Mixture
RAP_{actual}	Percentage of Actual RAP Including RAP Binder Added in the Mixture
δ	Phase Angle
KBr	Potassium Bromide
ε_r	Recovery After One Cycle of Loading
RG	Relative G*Sin δ
A	Regression Parameter
ε_{10}	Shear Strain at the End of One Cycle of Loading
ε_1	Shear Strain at the End of 1 Second of Loading
c_i	Specific Heat Capacity of Material Type I
G_0	Static Modulus When Ω→ 0
G"	Storage Modulus
SIP	Stripping Inflection Point