

Chapter 4

Analysis and Results

4.1 Introduction of computer software program

The development of flexible pavement thickness design software was done by using Microsoft Visual Basic Dot net programming language. The concept and method of design applied was by using AASHTO and Road Note 31. The program has been done in a complete set of coding including important command such as compute, analysis and formula. All the important chart and table data were been interpolated into coding to be refer as automatically while running the program for calculating the result output

Besides, a nice and simple interface of the software program were been create for users to key in all the important inputs data requires in the design proves and show the result output in report view. The result of analysis will be explained into two major parts in the subtitle below:

1. Result analysis of AASHTO Design
2. Result analysis of Road Note 31

The expected result finding was aim to design the flexible pavement thickness design has been made by using AASHTO and

Road Note 31 method in term of thickness different and economic evaluation by using this computer software.

4.2 Homepage and Main Menu

Once the user had successful to log into program, the program will directly go to main form (Figure 4.1). the function of main menu form are the main control for user to choose the form and function they need such as current Material Price form, AASHTO design form, Road note 31 form, view Report form and log out button.

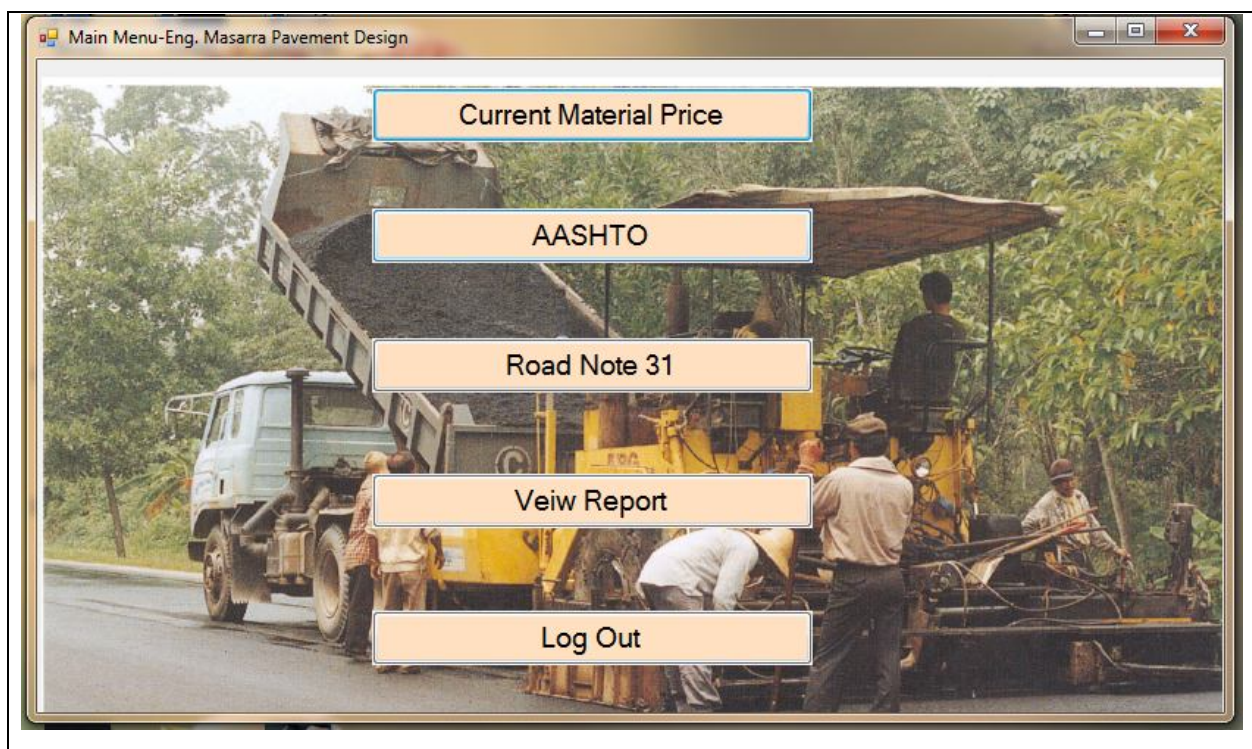
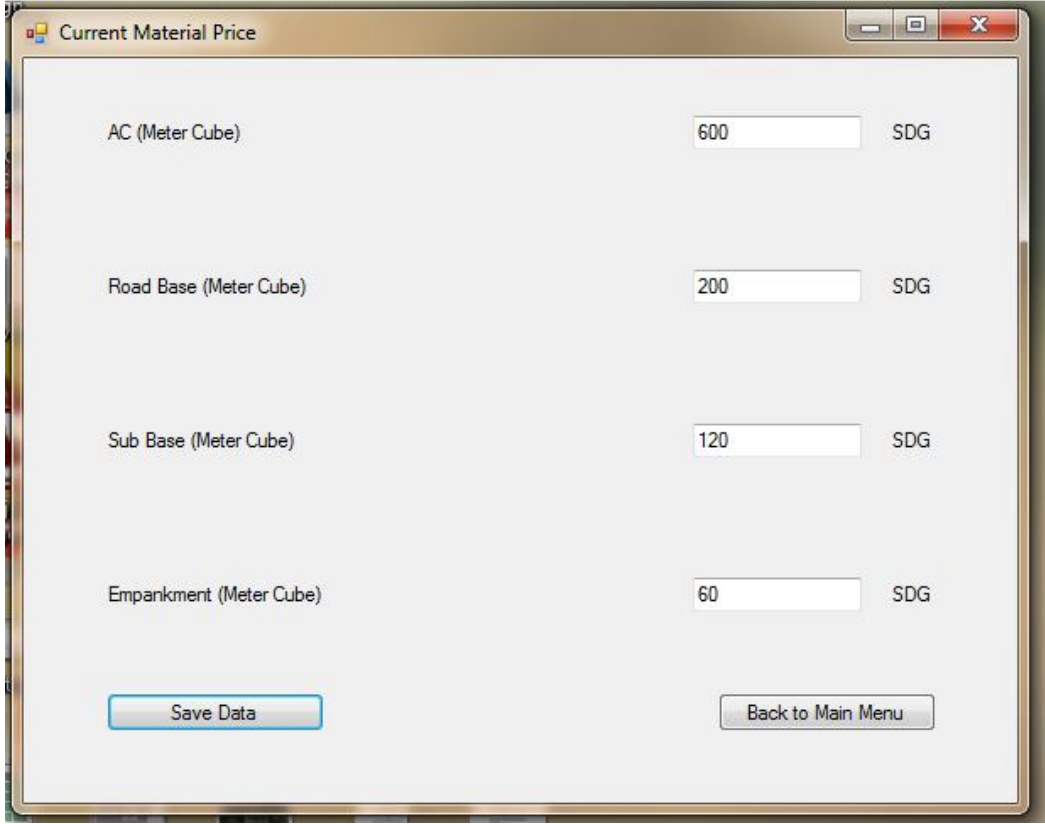


Figure 4.1: Main Menu Form

4.3 Current Material Price

The current material price will appear when the Current Material Price command button had selected. The current material price was act as an important input in cost analysis and economic evaluation for AASHTO and Road Note 31 design. The current material price was already been saved in the system. The user just needs to inter the data and call the current material price data as shown in Figure 4.2.



The screenshot displays a software window titled "Current Material Price". Inside the window, there are four rows of input fields. Each row consists of a text label, a numeric input box, and a unit label "SDG". The labels and their corresponding values are: "AC (Meter Cube)" with "600", "Road Base (Meter Cube)" with "200", "Sub Base (Meter Cube)" with "120", and "Empankment (Meter Cube)" with "60". At the bottom of the window, there are two buttons: "Save Data" on the left and "Back to Main Menu" on the right.

Material Type	Value	Unit
AC (Meter Cube)	600	SDG
Road Base (Meter Cube)	200	SDG
Sub Base (Meter Cube)	120	SDG
Empankment (Meter Cube)	60	SDG

Figure 4.2: Current Material Price Form

4.4 AASHTO Design

The AASHTO form will be appear when the AASHTO command button had been selected. There were 5 major Tabs in this form known as AASHTO inputs tab, resilient modulus tab, drainage coefficient (mi) tab, AASHTO thickness design tab final result tab as shown in Figures 4.3.

Eng. Masarra-AASHTO Pavement Design

AASHTO Inputs | Resilient Modulus | mi | AASHTO Thickness | Final Result

Please key in the input values below:

Reliability, R(%)	95	Traffic Input Data	
Standard Deviation (S0)	0.35	Design Period (year)	15
Initial Serviceability Index	4.6	Cumulative 2 direction 18-kip ESAL, wa18	2.5 x 10 ⁶
Terminal Serviceability Index	2.5	Growth Rate (%)	3
Elastic Modulus		Directional Distribution, Dd (%)	50
Elastic Modulus, Eac (psi) of Asphalt Concrete	= 400000	Lane Distribution Factor, DL (%)	80
Elastic Modulus, Ebs (psi) of Base Layer	= 30000		
Elastic Modulus, Esb (psi) of Subbase Layer	= 11000		

DONE

Result Data

Traffic during 1st year, w18 - Dd - DL x wa18	= 1,000,000.0X 10 ⁶	Structured Layer Coefficient	
Cumulative 18-KIP ESAL, w18 - w18(1st year)	18598913.8866922	a1 =	0.42
Design Serviceability Loss Δ PSI = P0 - Pt	2.1	a2 =	0.14
Standard Normal Deviate (ZR)	-1.645	a3 =	0.08

Figure 4.3: AASHTO Form

4.4.1 AASHTO Inputs

The AASHTO input as shown in Figure 4.3 was an important general input data collection for the entire program such as reliability, Standard Deviation, initial and terminal serviceability index, Traffic input data and Elastic modulus data for each layer of pavement. This input are important in order to determine the result of traffic during first year, cumulative 18-KIP ESAL, design serviceability loss, standard normal deviate and structural layer coefficient (a_1, a_2 and a_3), besides, the lane distribution factor (Figure 4.4) which use to choose the percentage of 18-Kip ESAL in design lane.

No. of Lanes in Each Direction	% of 18-kip ESAL in the Design Lane
1	100
2	80–100
3	60–80
4	50–70

Figure 4.4: Lane Distribution Factor Form

4.4.2 Resilient Modulus

The second important input in AASHTO design was resilient modulus shown in Figure 4.5 to determine the effective roadbed soil resilient modulus, MR. Besides, the relative damage (u) form show in figure 4.6, which uses to convert the soil modulus to relative damage values.

Eng. Masarra-AASHTO Pavement Design

AASHTO Inputs Resilient Modulus mi AASHTO Thickness Final Result

Resilient Modulus

Month	Input 1	Input 2	Input 3	Month	Input 1	Input 2	Input 3
JAN	6500		0.16823758280685	JULY	6500		0.16823758280685
	20000		0.01240201971424		6500		0.16823758280685
FEB	20000		0.01240201971424	AUG	6500		0.16823758280685
	4000		0.51892288918468		6500		0.16823758280685
MAR	5000		0.30922286328283	SEP	6500		0.16823758280685
	5000		0.30922286328283		5000		0.30922286328283
APR	5000		0.30922286328283	OCT	5000		0.30922286328283
	5000		0.30922286328283		5000		0.30922286328283
MAY	5000		0.30922286328283	NOV	5000		0.30922286328283
	5000		0.30922286328283		6500		0.16823758280685
JUNE	6500		0.16823758280685	DEC	6500		0.16823758280685
	6500		0.16823758280685		6500		0.16823758280685

Average u = $\frac{\text{Total u}}{n} = \frac{5.486568972316}{24} = 0.2286070405$ Effective Roadbed Soil Resilient Modulus, MR = 5695.26541303

Ref Compute

Figure 4.5: Resilient Modulus Form

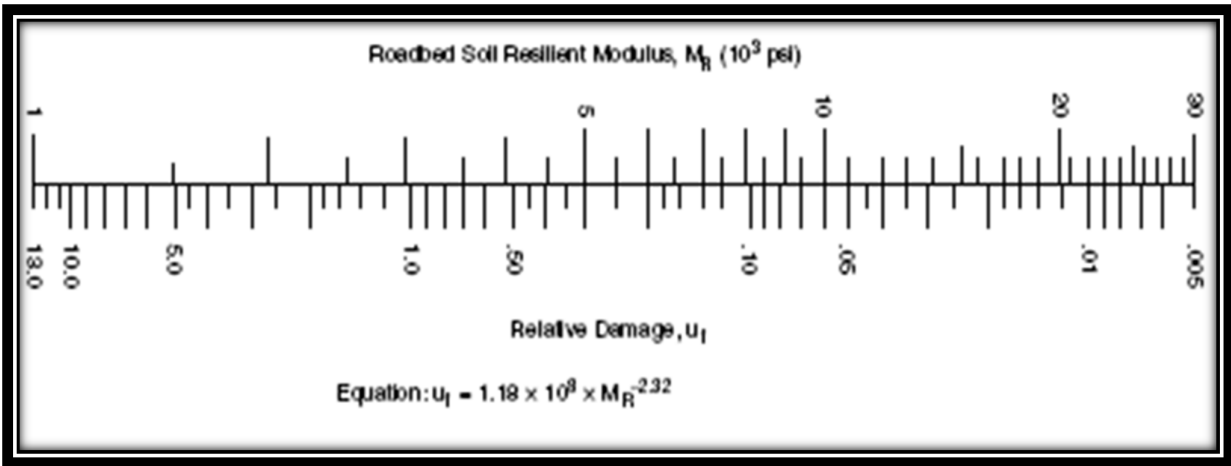


Figure 4.6: Relative Damage, u form

4.4.3 Drainage Coefficient (M_i)

Figure 4.7 was shown the Drainage coefficient (M_i) form in AASHTO design. There was main input needed to determine the drainage coefficient which can be obtained from the site condition known as quality of drainage and percentage of pavement exposed to moisture level as shown in figure 4.8 also had been completely interpolated and stored into the system database.

Eng. Masarra-AASHTO Pavement Design

AASHTO Inputs | Resilient Modulus | mi | AASHTO Thickness | Final Result

Drainage Coefficient

Quality of Drainage: Excellent

Ref

Drainage Coefficient, mi = 1.2

Exposed to Moisture Level Approaching Saturated (%): >25%

Compute

Figure 4.7: Drainage Coefficient (Mi) Form

Quality of Drainage	Percent of Time Pavement Structure is Exposed to Moisture Levels Approaching Saturation			
	Less Than 1%	1-5%	5-25%	Greater Than 25%
Excellent	1 25-1 20	1 20-1 15	1 15-1 10	1 10
Good	1 20-1 15	1 15-1 10	1 10-1 00	1 00
Fair	1 15-1 10	1 10-1 00	1 00-0 90	0 90
Poor	1 10-1 00	1 00-0 90	0 90-0 80	0 80
Very poor	1 00-0 90	0 90-0 80	0 80-0 70	0 70

Figure 4.8: Drainage Coefficient Form

4.4.4 ASHTO Thickness Design

In the AASHTO Thickness Design form (Figure 4.9), the thickness design was calculated automatically from the AASHTO design formula, which had been coding into the system. The process of design including interpolation. Try and error, besides, all the important input from previous process also will be calling automatically into the form for calculation and formulating purpose. The result of AASHTO thickness design were successful accurately verify between manual calculation and the software program developed.

The screenshot shows the 'Eng. Masarra-AASHTO Pavement Design' software window. The 'AASHTO Thickness' tab is active, displaying the 'Flexible Pavement Thickness Design' form. The form is divided into several sections:

- Results:**
 - Standard Normal Deviate (Z_R) = -1.645
 - Standard Deviation (S₀) = 0.35
 - Δ PSI = 2.1
 - Effective Roadbed Soil Resilient Modulus, MR = 5695.26541303255
 - Cumulative 18-KIP ESAL, w₁₈ = 18598913.8866922
- Structural Layer Coefficient:**
 - a₁ = 0.42
 - a₂ = 0.14
 - a₃ = 0.08
- Structural Number, SN:**
 - SN = 5.545800000000041
 - SN₁ = 3.200100000000233
 - SN₂ = 4.507800000000283
- Thickness of Layers:**
 - D₁* = SN₁/a₁ = 7.61928571429126
 - SN₁* = a₁ x D₁* = 3.200100000000233
 - D₂* = (SN₂ - SN₁*) / (a₂ x m₂) = 7.78392857143155
 - SN₂ = a₂ x D₂* = 1.089750000000042
 - D₃* = (SN₃ - SN₁* + SN₂*) / (a₃ x m₃) = 13.0828124999756
 - Total Thickness = 28.4860267856984

An 'Analyze' button is located at the bottom left of the form.

Figure 4.9: ASHTO Thickness Design Form

Figure 4.10 show the Nomo graph for AASHTO design which been applied into the system and as reference form for the users in order to determine the structural numbers (SN) for each layer of pavement. In this design, the total thickness of pavement was 28.48 inches as shown in Figure 4.9.

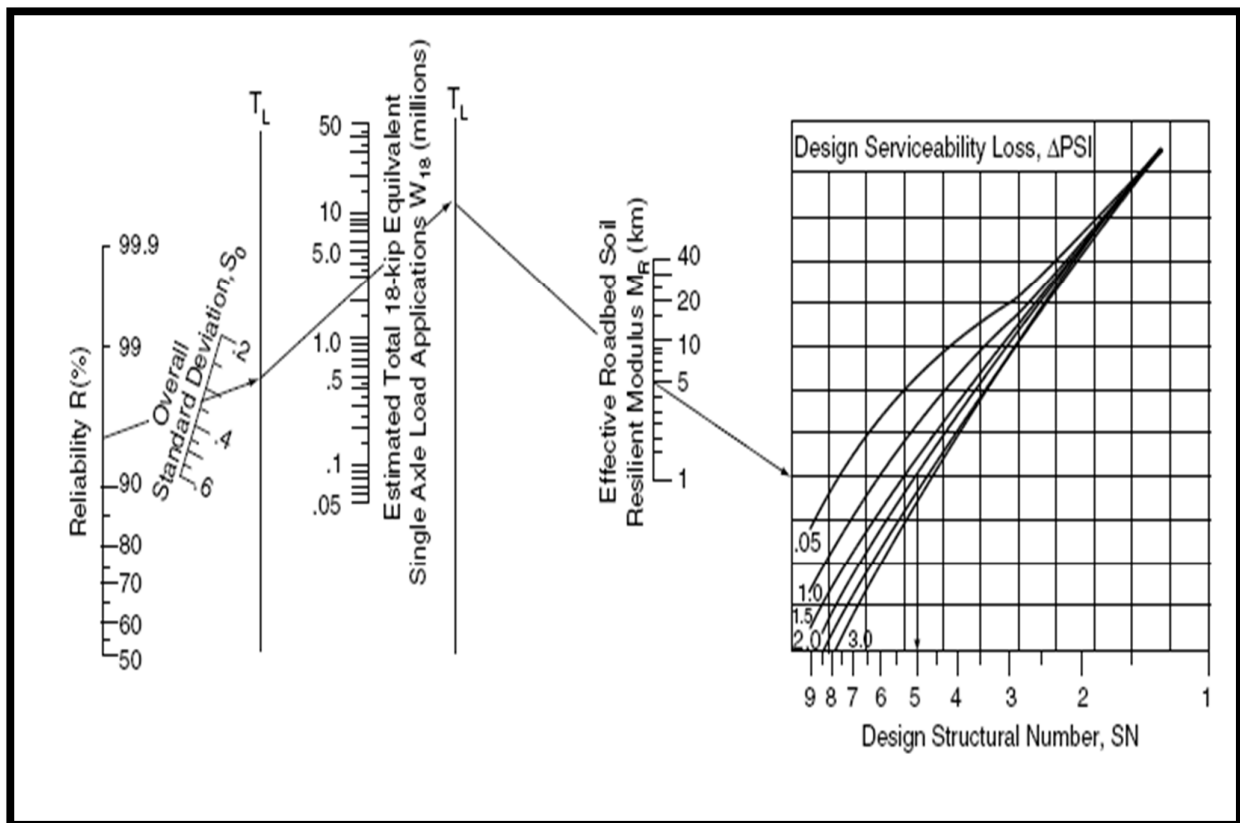


Figure 4.10: Nomo graph of ASHTO Thickness Design Form

Eng. Masarra-AASHTO Pavement Design

AASHTO Inputs Resilient Modulus mi AASHTO Thickness Final Result

Thickness Result

Surface = 193.529857142998

RoadBase = 197.711785714361

SubBase = 332.30343749938

Total Thickness = 723.545080356739

Cost Analysis

Please Select No. of Road Lanes 2 Lanes 2 Carriage Way

Total Cost = 1368.75678750018

Analyze Go to RN31 Back to Menu

Figure 4.11: ASHTO Final Result Form

Beside, this program software also provides the cost analysis to represent the cost for the whole pavement structures as shown in Figure 4.11. The user can choose the numbers of road lanes to identify the project cost base on the design analysis, which has been done. In this design, the total cost for AASHTO design was SDG 1368.75 per meter run. For total thickness of 723.5 mm.

4.5 Road Note 31

Another design method provided in this software program was Road Note 31. The road Note 31 design form will be present when user selects the Road Note 31 command button at the menu form as shown in figure 4.12.

Eng. Masara - Road Note 31 Design

Cumulative ESAL = 18600000

Traffic Class = T8

Depth of Water from formation (m) (Moisture Supply) = 0.5

Subgrade Strength Class = S1

Subgrade Plasticity Index, PI = >40

Please Select No of Road Lanes = 2 Lanes 2 Carriage Way

Traffic and Subgrade Classes Reference

Analyze

Asphalt 150

Base 250

Sub-Base 250

Embankment 350

Total Thickness = 1000 mm

Total Cost = 1337 SDG

Ref.

Back to Menu

Figure 4.12: Road Note 31 design form

In Road Note 31 design, some inputs were calling from ASHTO design that the user key in previously. This inputs been sharing was cumulative traffic loading (ESA).

The cumulative traffic loading (ESA) is used to identify traffic classes, meanwhile the sub grade plasticity and depth of water formation level is used to identify the sub grade strength classes. In this design, the traffic classes was T8 and sub grade strength classes

was S1. Thus, the program will automatically generate the T8/S1 structural catalogue (Figure 4.12) which been stored in the software database system

Against, the user also can choose the numbers of road lanes to identify the project cost base on Road Note 31 design analysis been done. In this design, the total cost for Road Notre 31 design was SDG 1337per meter run for total thickness of 1000mm.

The referent forms for Road Note 31 are shown in Figure 4.14 about material definitions, traffic classes and sub grade strength classes to guide the users.

Material Definitions	Subgrade strength classes (CBR%)	Traffic classes (10 ⁶ esa)
 Double surface dressing	S1 = 2	T1 = < 0.3
 Flexible bituminous surface	S2 = 3 - 4	T2 = 0.3 - 0.7
 Bituminous surface (Usually a wearing course, WC, and a basecourse, B)	S3 = 5 - 7	T3 = 0.7 - 1.5
 Bituminous roadbase, RB	S4 = 8 - 14	T4 = 1.5 - 3.0
 Granular roadbase, GB1 - GB3	S5 = 15 - 29	T5 = 3.0 - 6.0
 Granular sub-base, GS	S6 = 30+	T6 = 6.0 - 10
 Granular capping layer or selected subgrade fill, GC		T7 = 10 - 17
 Cement or lime-stabilised roadbase 1, CB1		T8 = 17 - 30
 Cement or lime-stabilised roadbase 2, CB2		
 Cement or lime-stabilised sub-base, CS		

Estimated design subgrade strength class under sealed roads in the presence of a water table					
Depth of water table* from formation level (metres)	Subgrade strength class				
	Non-plastic sand	Sandy clay PI=10	Sandy clay PI=20	Silty clay PI=30	Heavy clay PI>40
0.5	S4	S4	S2	S2	S1
1	S5	S4	S3	S2	S1
2	S5	S5	S4	S3	S2
3	S6	S5	S4	S3	S2

* The highest seasonal level attained by the water table should be used.

Notes: 1. Since the strength classes given in Table 3.2 are based on estimated minimum CBR values, wherever possible the CBR should be measured by laboratory testing at the appropriate moisture content.

2. Table 3.2 is not applicable for silt, micaceous, organic or tropically weathered clays. Laboratory CBR tests should be undertaken for these soils.

Figure 4.13: Material Definitions, Traffic and sub grade Strength Classes for Road Note 31

4.6 View Report

In this software program, the report saved can be viewed directly by selecting the view Report command button, then the view report form was presented showing in Figure 4.14 by using the software program.

<<<< Data Save Report >>>>
***** AASHTO ROAD NOTE 31 PAVEMENT THICKNESS DESIGN *****

<<<< AASHTO DESIGN >>>> Reliability, R = 95 Standard Deviation S0 = 0.35 Initial Serviceability Index, P0 = 4.6 Terminal serviceability Index, pt = 2.5 Standard Normal Deviation, ZR = -1.645 Design Period = 15 Growth Rate = 3 Directional Distribution = 50 Lane Distribution Factor = 80 Design serviceability Loss PSI = 2.1 Effective Roadbed soil Resilient Modulus, MR = Drainage Coefficient, mi = 1.2 < Elastic Modulus > Eac = 400000 Ebs = 30000 Esb = 11000 < Traffic Loading > Cumulative 2 direction 18-KIP ESAL, wa18 = 2.5 Traffic During 1st Year, w18 = 1,000,000.0X 10 ⁶ Cumulative 18-Kip ESAL, W18 = 18598913.8866922 < Structural Numbers > SN = 5.54580000000041 SN1 = 3.200100000000233 SN2 = 4.507800000000283 < Thickness of Layers > D1* = 7.61928571429126 SN1* = 3.200100000000233 D2* = 7.78392857143155 13.08% 99756	<<<< RODE NOTE PAVEMENT DESIGN >>>> Cumulative ESAL = 18600000 Depth of Water from formation (m) (Moisture Supply) = 0.5 Subgrade Plasticity Index, PI = >40 Traffic Class = T8 Subgrade Strength Class = S1 Asphalt = 150 Base = 250 Sub-Base = 250 Embankment = 350
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Figure 4.14: View Report Form

Chapter 5

Discussion

5.1 Discussion

The results obtain as shown in Figure 4.14 was more accuracy Therefore, this software design has meet the accuracy requirement and computerized result is because of different decimal place of numbering used.

The results obtained between both method (AASHTO & Road Note 31) may different because AASHTO thickness design considers Reliability, standard deviation and serviceability loss meanwhile road Note 31 considers CBR value, plasticity index and ground water table to determine the pavement thickness. Therefore, this different of assumption and consideration between both methods may affect the result of pavement thickness design

Through the researches finding and analysis, AASHTO design are more accurate and economy because the thickness of pavement layer are based on each layer of structural numbers and the strength of elastic modulus apply for each pavement layer compared to the thickness design of road Note31, which are already fix in the structural catalogue and limited of pavement thickness design. For road Note 31 design, most of the cases of pavement thickness design resulting more thickly than AASHTO design. This is

because Road note 31 was an experience base design from previous senior engineer and highway professional then produced the structural catalogue from the past successful highway projects.

5.2 Advantage of the Software Program Developed

Obviously, there are some significant and purpose to carry out a software program development to made an advance improvement. There are several advantages for this software program development as listed below:

1. To improve the design process with minimum error and human mistakes that could lead to an incorrect design value.
2. Replace the conventional method from manual calculation to computerized method which require time and energy saving.
3. Made the flexible pavement design stage become flexible, easy and simple because all the important data, parameter, formula, table and graph been interpolated data, parameter, formula, table and graph been interpolated and store in the system database. Therefore, the user just need to call and open the data require every time used this software program.
4. All the important data such as input, formula and result obtained can be store and recorded to be printed as referenced in hard copy or keep softcopy.
5. Useful for any emergency and critical project that required minimum time design period urgent approval for local authority.

6. Helpful to the designer and road engineer in the pavement thickness design also for learning practice by student and lecture in teaching syllabus.
7. Achieve high confidently and accuracy of quality design result obtained. Besides, the result of pavement thickness design can be represented in a nice graphical view the overall thickness from this software.

5.3 disadvantage of the software program developed

However, there are also some disadvantages by using the software program in flexible thickness design that can be consider as listed below:

1. The software program developed just can run or used by electronic computer device compare to manual calculation are easier by using calculator, chart and graph require in hardcopy.
2. The result been save in soft copy may disrupt or destroy by virus or computer formatted and cause all the important design result gone and double work are required to redesign against.
3. Another disadvantage of the computer software is the quality of result does not guaranty if the input parameter are wrong.
4. Software program also required high understanding or manual guide on how to use the computer program.

Chapter 6

Conclusion and Recommendation

6.1 Introduction

This chapter was discussed about the recommendation to improve the software developed and conclusion drawn.

6.2 Conclusion

Through the research of software development, the result obtained was successfully achieved as expected. The software was found to be successful in order to determine the pavement thickness design based on AASHTO and ROAD NOTE 31. Both of the methods was carried out shown differences in terms of thickness and cost evaluation for AASHTO and ROAD NOTE 31. Therefore, Through this software of flexible thickness design program development, the users can easily analyze and obtain the result to select the best design method.

Thus, development of software to design of pavement thickness is very important to save cost, time and energy. This software is confident to be applied and achieve high accuracy of result obtain. Thus, the design stage can be made in a very short time period of design process and help to minimize the error

factor compare to manual calculation or conventional method by applies this computer program. Computer software also can give high accuracy and quality of result for pavement thickness design.

Apart from that by using this software, all the important data such as input, formula and result obtained can be stored and recorded as references and become helpful for the designer and road engineer in the pavement thickness design. Therefore, computer software of flexible pavement thickness design is very useful tool in highway engineering specially to design the thickness of flexible pavement.

6.3 Recommendation

1. Provide or standby the source required especially at site in case there are no electronic device available.
2. Print out the result design in hard copy every time after finish design using this program. Beside, user also can keep a backup copy on the softcopy in CD or diskette.
3. be very careful to avoid incorrect input parameter to avoid any wrong design, beside, user are also recommended to carry site visit to get the real project data on the sport such as traffic loading data, required souses of pavement material on currently, sub grade condition, drainage condition and other more to insure the input parameter are quality accurate.
4. Practice and learn to using the computer before apply it into the real project design.
5. Carry further in the future and advance in comparison with more other design method to get more alternatives for the best thickness and economic evaluation purpose.

References

- 1- Overseas Road Note 31 “A Guide to structural design of bitumen – surfaced road in tropical and subtropical countries”, fourth edition, published by Transport Research Laboratory, Old Wokingham Road Crowthorne, Berkshire RG45 6AU.
- 2-AASHTO guide “for design of pavement structure” 1993, published by the American Association of State Highway and Transportation Officials, 444N. Capitol Street, N.W., Suite 249 Washington, D.C.20001.
- 3- The Handbook of Highway Engineering-FWA, Published in 2006 by CRC Press, Taylor & Francis Group, 6000 Broken Sound Parkway.
- 4- Pavement Analysis and Design, Second Edition, Yang H. Huang, University of Kentucky, PEARSON Prentice Hall, Upper Saddle River, NJ 07458.
- 5-Programming in Visual Basic 2010,The Very Beginner’s Guide, Published in the United States of America by Cambridge University Press, New York Jim McKeown, Dakota State University,.

Appendices

AASHTO CODING

```
Dim R As Double
Dim Dd As Double
Dim DL As Double
Dim traffic1 As Double
Dim w18 As Double
Dim g As Double
Dim t As Double
' Dim W18c As Double
Dim P0 As Double
Dim Pt As Double
Dim DeltaPSI As Double
Dim Eac As Double
Dim Ebs As Double
Dim Esb As Double
Dim ZR As Double
'Dim a1 As Double
Dim a2 As Double
Dim a3 As Double
R = ComboBox1.Text
Dd = ComboBox5.Text
DL = ComboBox6.Text
w18 = TextBox6.Text
g = ComboBox4.Text
t = ComboBox3.Text
P0 = TextBox1.Text
Pt = TextBox2.Text
Eac = TextBox3.Text
Ebs = TextBox4.Text
Esb = TextBox5.Text
DeltaPSI = P0 - Pt

traffic1 = ((Dd / 100 * DL / 100)) * w18 * 10 ^ 6

TextBox7.Text = traffic1
TextBox8.Text = (traffic1 * ((1 + g / (100)) ^ t - 1)) / (g / 100)
TextBox9.Text = DeltaPSI

If R = 99.9 Then
    ZR = -3.09
ElseIf R = 99 Then
    ZR = -2.327
ElseIf R = 95 Then
    ZR = -1.645
ElseIf R = 90 Then
    ZR = -1.282
ElseIf R = 85 Then
    ZR = -1.037
ElseIf R = 80 Then
    ZR = -0.841
ElseIf R = 75 Then
    ZR = -0.674
```

```

ElseIf R = 70 Then
    ZR = -0.524
ElseIf R = 50 Then
    ZR = 0
End If
TextBox10.Text = ZR

If Eac = 100000 Then
    TextBox11.Text = 0.2
ElseIf Eac = 150000 Then
    TextBox11.Text = 0.25
ElseIf Eac = 200000 Then
    TextBox11.Text = 0.3
ElseIf Eac = 250000 Then
    TextBox11.Text = 0.32
ElseIf Eac = 300000 Then
    TextBox11.Text = 0.36
ElseIf Eac = 350000 Then
    TextBox11.Text = 0.36
ElseIf Eac = 400000 Then
    TextBox11.Text = 0.42
ElseIf Eac = 450000 Then
    TextBox11.Text = 0.45
ElseIf Eac = 500000 Then
    TextBox11.Text = 0.465

End If
a2 = 0.249 * Math.Log10(Ebs) - 0.977
TextBox12.Text = a2
a3 = 0.227 * Math.Log10(Esb) - 0.839
TextBox13.Text = a3
End Sub

```

```

Private Sub Button1_Click(sender As System.Object, e As System.EventArgs) Handles
Button1.Click

```

```

    Dim R As Double
    Dim Dd As Double

    Dim DL As Double
    Dim traffic1 As Double
    Dim w18 As Double
    Dim g As Double
    Dim t As Double
    'Dim W18c As Double
    Dim P0 As Double
    Dim Pt As Double
    Dim DeltaPSI As Double
    Dim Eac As Double
    Dim Ebs As Double
    Dim Esb As Double
    Dim ZR As Double
    'Dim a1 As Double
    Dim a2 As Double
    Dim a3 As Double
    R = ComboBox1.Text
    Dd = ComboBox5.Text
    DL = ComboBox6.Text
    w18 = TextBox6.Text
    g = ComboBox4.Text
    t = ComboBox3.Text
    P0 = TextBox1.Text

```

```

Pt = TextBox2.Text
Eac = TextBox3.Text
Ebs = TextBox4.Text
Esb = TextBox5.Text

DeltaPSI = P0 - Pt

traffic1 = FormatNumber((Dd / 100 * DL / 100)) * w18 * 10 ^ 6

TextBox7.Text = Format(traffic1, "#,0.0#") & "X 10^6"
TextBox8.Text = (traffic1 * ((1 + g / (100)) ^ t - 1)) / (g / 100)
TextBox9.Text = DeltaPSI

If R = 99.9 Then
    ZR = -3.09
ElseIf R = 99 Then
    ZR = -2.327
ElseIf R = 95 Then
    ZR = -1.645
ElseIf R = 90 Then
    ZR = -1.282
ElseIf R = 85 Then
    ZR = -1.037
ElseIf R = 80 Then
    ZR = -0.841
ElseIf R = 75 Then
    ZR = -0.674
ElseIf R = 70 Then
    ZR = -0.524
ElseIf R = 50 Then
    ZR = 0
End If
TextBox10.Text = ZR

If Eac = 100000 Then
    TextBox11.Text = 0.2
ElseIf Eac = 150000 Then
    TextBox11.Text = 0.25
ElseIf Eac = 200000 Then
    TextBox11.Text = 0.3
ElseIf Eac = 250000 Then
    TextBox11.Text = 0.32
ElseIf Eac = 300000 Then
    TextBox11.Text = 0.36
ElseIf Eac = 350000 Then
    TextBox11.Text = 0.36
ElseIf Eac = 400000 Then
    TextBox11.Text = 0.42
ElseIf Eac = 450000 Then
    TextBox11.Text = 0.45
ElseIf Eac = 500000 Then
    TextBox11.Text = 0.465

End If
a2 = FormatNumber(0.249 * Math.Log10(Ebs) - 0.977, 2)
TextBox12.Text = a2
a3 = FormatNumber(0.227 * Math.Log10(Esb) - 0.839, 2)
TextBox13.Text = a3
End Sub

Private Sub Button3_Click(sender As System.Object, e As System.EventArgs) Handles
Button3.Click

```

```

    TextBox26.Text = 1.18 * 10 ^ 8 * Val((TextBox14.Text) ^ -2.32)
    TextBox27.Text = 1.18 * 10 ^ 8 * Val((TextBox15.Text) ^ -2.32)
    TextBox28.Text = 1.18 * 10 ^ 8 * Val((TextBox16.Text) ^ -2.32)
    TextBox29.Text = 1.18 * 10 ^ 8 * Val((TextBox17.Text) ^ -2.32)
    TextBox30.Text = 1.18 * 10 ^ 8 * Val((TextBox18.Text) ^ -2.32)
    TextBox31.Text = 1.18 * 10 ^ 8 * Val((TextBox19.Text) ^ -2.32)
    TextBox32.Text = 1.18 * 10 ^ 8 * Val((TextBox20.Text) ^ -2.32)
    TextBox33.Text = 1.18 * 10 ^ 8 * Val((TextBox21.Text) ^ -2.32)
    TextBox34.Text = 1.18 * 10 ^ 8 * Val((TextBox22.Text) ^ -2.32)
    TextBox35.Text = 1.18 * 10 ^ 8 * Val((TextBox23.Text) ^ -2.32)
    TextBox36.Text = 1.18 * 10 ^ 8 * Val((TextBox24.Text) ^ -2.32)
    TextBox37.Text = 1.18 * 10 ^ 8 * Val((TextBox25.Text) ^ -2.32)
    TextBox50.Text = 1.18 * 10 ^ 8 * Val((TextBox38.Text) ^ -2.32)
    TextBox51.Text = 1.18 * 10 ^ 8 * Val((TextBox39.Text) ^ -2.32)
    TextBox52.Text = 1.18 * 10 ^ 8 * Val((TextBox40.Text) ^ -2.32)
    TextBox53.Text = 1.18 * 10 ^ 8 * Val((TextBox41.Text) ^ -2.32)
    TextBox54.Text = 1.18 * 10 ^ 8 * Val((TextBox42.Text) ^ -2.32)
    TextBox55.Text = 1.18 * 10 ^ 8 * Val((TextBox43.Text) ^ -2.32)
    TextBox56.Text = 1.18 * 10 ^ 8 * Val((TextBox44.Text) ^ -2.32)
    TextBox57.Text = 1.18 * 10 ^ 8 * Val((TextBox45.Text) ^ -2.32)
    TextBox58.Text = 1.18 * 10 ^ 8 * Val((TextBox46.Text) ^ -2.32)
    TextBox59.Text = 1.18 * 10 ^ 8 * Val((TextBox47.Text) ^ -2.32)
    TextBox60.Text = 1.18 * 10 ^ 8 * Val((TextBox48.Text) ^ -2.32)
    TextBox61.Text = 1.18 * 10 ^ 8 * Val((TextBox49.Text) ^ -2.32)
    TextBox62.Text = Val(TextBox26.Text) + Val(TextBox27.Text) + Val(TextBox28.Text) +
Val(TextBox29.Text) + Val(TextBox30.Text) + Val(TextBox31.Text) + Val(TextBox32.Text)
+ Val(TextBox33.Text) + Val(TextBox34.Text) + Val(TextBox35.Text) + Val(TextBox36.Text) +
Val(TextBox37.Text) + Val(TextBox50.Text) + Val(TextBox51.Text) + Val(TextBox52.Text)
+ Val(TextBox53.Text) + Val(TextBox54.Text) + Val(TextBox55.Text) + Val(TextBox56.Text) +
Val(TextBox57.Text) + Val(TextBox58.Text) + Val(TextBox59.Text) + Val(TextBox60.Text)
+ Val(TextBox61.Text)
    TextBox63.Text = 24
    TextBox64.Text = TextBox62.Text / TextBox63.Text
    TextBox65.Text = ((1.18 * 10 ^ 8 / Val(TextBox64.Text)) ^ (1 / 2.32))
End Sub

```

```

Private Sub TextBox67_TextChanged(sender As System.Object, e As System.EventArgs)
Handles TextBox67.TextChanged
    TextBox67.Text = Val(TextBox10.Text)
End Sub

```

```

Private Sub Button6_Click(sender As System.Object, e As System.EventArgs) Handles
Button6.Click

```

```

    Me.TextBox67.Text = Me.TextBox10.Text
    Me.TextBox68.Text = Me.ComboBox2.Text
    Me.TextBox69.Text = Me.TextBox9.Text
    Me.TextBox70.Text = Me.TextBox65.Text
    Me.TextBox71.Text = Me.TextBox8.Text
    Me.TextBox73.Text = Me.TextBox11.Text
    Me.TextBox74.Text = Me.TextBox12.Text
    Me.TextBox75.Text = Me.TextBox13.Text

```

```

!*****

```

```

Dim x As Double
Dim x1 As Double
Dim x2 As Double

```

```

Dim SN As Double = 0.01
Dim SN1 As Double = 0.01
Dim SN2 As Double = 0.01

Do While x <= Math.Log10(Val(TextBox8.Text))

    x = -1.645 * 0.35 + 9.36 * Math.Log10(SN + 1) - 0.2 + Math.Log10((2.1) / (2.7)) / (0.4 + (1094) / (SN + 1) ^ 5.19) + 2.32 * Math.Log10(5698) - 8.07

    'x = Val(TextBox10.Text) * Val(ComboBox2.Text) + 9.36 * Math.Log10(SN + 1) - 0.2 + Math.Log10((Val(TextBox9.Text) / (4.2 - 1.5)) / (0.4 + ((1094) / (SN + 1) ^ 5.19))) + 2.32 * Math.Log10(Val(TextBox65.Text)) - 8.07

    SN = SN + 0.0001
    TextBox76.Text = SN
Loop
'=====
Do While x1 <= Math.Log10(Val(TextBox8.Text))

    x1 = -1.645 * 0.35 + 9.36 * Math.Log10(SN1 + 1) - 0.2 + Math.Log10((2.1) / (2.7)) / (0.4 + (1094) / (SN1 + 1) ^ 5.19) + 2.32 * Math.Log10(30000) - 8.07

    'x1 = Val(TextBox10.Text) * Val(ComboBox2.Text) + 9.36 * Math.Log10(SN1 + 1) - 0.2 + Math.Log10((Val(TextBox9.Text) / (4.2 - 1.5)) / (0.4 + ((1094) / (SN1 + 1) ^ 5.19))) + 2.32 * Math.Log10(30000) - 8.07

    SN1 = SN1 + 0.0001
    TextBox77.Text = SN1
Loop
'=====
Do While x2 <= Math.Log10(Val(TextBox8.Text))

    x2 = -1.645 * 0.35 + 9.36 * Math.Log10(SN2 + 1) - 0.2 + Math.Log10((2.1) / (2.7)) / (0.4 + (1094) / (SN2 + 1) ^ 5.19) + 2.32 * Math.Log10(11000) - 8.07

    'x2 = Val(TextBox10.Text) * Val(ComboBox2.Text) + 9.36 * Math.Log10(SN2 + 1) - 0.2 + Math.Log10((Val(TextBox9.Text) / (4.2 - 1.5)) / (0.4 + ((1094) / (SN2 + 1) ^ 5.19))) + 2.32 * Math.Log10(11000) - 8.07

    SN2 = SN2 + 0.0001
    TextBox78.Text = SN2
Loop

'*****
TextBox79.Text = Val(TextBox77.Text) / Val(TextBox73.Text)
TextBox80.Text = Val(TextBox73.Text) * Val(TextBox79.Text)
TextBox81.Text = (Val(TextBox78.Text) - Val(TextBox77.Text)) / (Val(TextBox74.Text) * Val(TextBox66.Text))
TextBox82.Text = Val(TextBox74.Text) * Val(TextBox81.Text)
TextBox83.Text = (Val(TextBox76.Text) - (Val(TextBox77.Text) + Val(TextBox82.Text))) / ((Val(TextBox75.Text) * Val(TextBox66.Text)))
TextBox84.Text = Val(TextBox79.Text) + Val(TextBox81.Text) + Val(TextBox83.Text)

```

End Sub

```
If (ComboBox7.Text = "Excellent") And (ComboBox8.Text = "<1%") Then
    TextBox66.Text = 1.375
ElseIf (ComboBox7.Text = "Excellent") And (ComboBox8.Text = "1-5%") Then
    TextBox66.Text = 1.325
ElseIf (ComboBox7.Text = "Excellent") And (ComboBox8.Text = "5-25%") Then
    TextBox66.Text = 1.25
ElseIf (ComboBox7.Text = "Excellent") And (ComboBox8.Text = ">25%") Then
    TextBox66.Text = 1.2
ElseIf (ComboBox7.Text = "Good") And (ComboBox8.Text = "<1%") Then
    TextBox66.Text = 1.3
ElseIf (ComboBox7.Text = "Good") And (ComboBox8.Text = "1-5%") Then
    TextBox66.Text = 1.2
ElseIf (ComboBox7.Text = "Good") And (ComboBox8.Text = "5-25%") Then
    TextBox66.Text = 1.075
ElseIf (ComboBox7.Text = "Good") And (ComboBox8.Text = ">25%") Then
    TextBox66.Text = 1
ElseIf (ComboBox7.Text = "Fair") And (ComboBox8.Text = "<1%") Then
    TextBox66.Text = 1.2
ElseIf (ComboBox7.Text = "Fair") And (ComboBox8.Text = "1-5%") Then
    TextBox66.Text = 1.1
ElseIf (ComboBox7.Text = "Fair") And (ComboBox8.Text = "5-25%") Then
    TextBox66.Text = 0.9
ElseIf (ComboBox7.Text = "Fair") And (ComboBox8.Text = ">25%") Then
    TextBox66.Text = 0.8
ElseIf (ComboBox7.Text = "Poor") And (ComboBox8.Text = "<1%") Then
    TextBox66.Text = 1.1
ElseIf (ComboBox7.Text = "Poor") And (ComboBox8.Text = "1-5%") Then
    TextBox66.Text = 0.925
ElseIf (ComboBox7.Text = "Poor") And (ComboBox8.Text = "5-25%") Then
    TextBox66.Text = 0.7
ElseIf (ComboBox7.Text = "Poor") And (ComboBox8.Text = ">25%") Then
    TextBox66.Text = 0.6
ElseIf (ComboBox7.Text = "Very Poor") And (ComboBox8.Text = "<1%") Then
    TextBox66.Text = 1
ElseIf (ComboBox7.Text = "Very Poor") And (ComboBox8.Text = "1-5%") Then
    TextBox66.Text = 0.85
ElseIf (ComboBox7.Text = "Very Poor") And (ComboBox8.Text = "5-25%") Then
    TextBox66.Text = 0.575
ElseIf (ComboBox7.Text = "Very Poor") And (ComboBox8.Text = ">25%") Then
    TextBox66.Text = 0.4
End If
```

End Sub

```
TextBox86.Text = Val(TextBox79.Text) * 25.4
TextBox87.Text = Val(TextBox81.Text) * 25.4
TextBox88.Text = Val(TextBox83.Text) * 25.4
TextBox89.Text = Val(TextBox84.Text) * 25.4
```

```
If (ComboBox9.Text = "2 Lanes 2 Carriage Way") Then
    TextBox90.Text = 7 * 1 * Val(TextBox86.Text) * Val(Form2.TextBox2.Text) / 1000 +
7 * 1 * Val(TextBox87.Text) * Val(Form2.TextBox6.Text) / 1000 +
7 * 1 * Val(TextBox88.Text) / 1000 * Val(Form2.TextBox7.Text)

ElseIf (ComboBox9.Text = "3 Lanes 1 Carriage Way") Then
    TextBox90.Text = 10.5 * 1 * Val(TextBox86.Text) * Val(Form2.TextBox2.Text) / 1000
+ 10.5 * 1 * Val(TextBox87.Text) * Val(Form2.TextBox6.Text) / 1000 +
10.5 * 1 * Val(TextBox88.Text) / 1000 * Val(Form2.TextBox7.Text)

ElseIf (ComboBox9.Text = "4 Lanes 2 Carriage Way") Then
```

```

        TextBox90.Text = 14 * 1 * Val(TextBox86.Text) * Val(Form2.TextBox2.Text) / 1000 +
14 * 1 * Val(TextBox87.Text) * Val(Form2.TextBox6.Text) / 1000 +
        14 * 1 * Val(TextBox88.Text) / 1000 * Val(Form2.TextBox7.Text)

        ElseIf (ComboBox9.Text = "6 Lanes 2 Carriage Way") Then
            TextBox90.Text = 21 * 1 * Val(TextBox86.Text) * Val(Form2.TextBox2.Text) / 1000 +
21 * 1 * Val(TextBox87.Text) * Val(Form2.TextBox6.Text) / 1000 +
            21 * 1 * Val(TextBox88.Text) / 1000 * Val(Form2.TextBox7.Text)

        End If
    End Sub

```

ROAD NOTE 31 CODING

```

Dim EASL As Double
Dim m As Double
'Me.TextBox1 = Form3.TextBox8.Text
'EASL = TextBox1.Text
If Val(TextBox1.Text < 300000) Then
    TextBox4.Text = "T1"
ElseIf Val(TextBox1.Text = 300000) Or Val(TextBox1.Text < 700000) Then
    TextBox4.Text = "T2"
ElseIf Val(TextBox1.Text = 700000) Or Val(TextBox1.Text < 1500000) Then
    TextBox4.Text = "T3"
ElseIf Val(TextBox1.Text = 1500000) Or Val(TextBox1.Text < 3000000) Then
    TextBox4.Text = "T4"
ElseIf Val(TextBox1.Text = 3000000) Or Val(TextBox1.Text < 6000000) Then
    TextBox4.Text = "T5"
ElseIf Val(TextBox1.Text = 6000000) Or Val(TextBox1.Text < 10000000) Then
    TextBox4.Text = "T6"
ElseIf Val(TextBox1.Text = 10000000) Or Val(TextBox1.Text < 17000000) Then
    TextBox4.Text = "T7"
ElseIf Val(TextBox1.Text = 17000000) Or Val(TextBox1.Text < 30000000) Then
    TextBox4.Text = "T8"

End If

If (ComboBox2.Text = 0.5) And (ComboBox3.Text = "Non-Plastic") Then
    TextBox5.Text = "S4"
ElseIf (ComboBox2.Text = 0.5) And (ComboBox3.Text = ">40") Then
    TextBox5.Text = "S1"

ElseIf (ComboBox2.Text = 1) And (ComboBox3.Text = "Non-Plastic") Then
    TextBox5.Text = "S5"
ElseIf (ComboBox2.Text = 1) And (ComboBox3.Text = ">40") Then
    TextBox5.Text = "S1"

ElseIf (ComboBox2.Text = 2) And (ComboBox3.Text = "Non-Plastic") Then
    TextBox5.Text = "S5"
ElseIf (ComboBox2.Text = 2) And (ComboBox3.Text = ">40") Then
    TextBox5.Text = "S2"

ElseIf (ComboBox2.Text = 3) And (ComboBox3.Text = "Non-Plastic") Then
    TextBox5.Text = "S6"
ElseIf (ComboBox2.Text = 3) And (ComboBox3.Text = ">40") Then
    TextBox5.Text = "S2"

```

```

ElseIf (ComboBox2.Text = 0.5) And (ComboBox3.Text = 10) Then
    TextBox5.Text = "S4"
ElseIf (ComboBox2.Text = 0.5) And (ComboBox3.Text = 20) Then
    TextBox5.Text = "S2"
ElseIf (ComboBox2.Text = 0.5) And (ComboBox3.Text = 30) Then
    TextBox5.Text = "S2"

ElseIf (ComboBox2.Text = 1) And (ComboBox3.Text = 10) Then
    TextBox5.Text = "S4"
ElseIf (ComboBox2.Text = 1) And (ComboBox3.Text = 20) Then
    TextBox5.Text = "S3"
ElseIf (ComboBox2.Text = 1) And (ComboBox3.Text = 30) Then
    TextBox5.Text = "S2"

ElseIf (ComboBox2.Text = 2) And (ComboBox3.Text = 10) Then
    TextBox5.Text = "S5"
ElseIf (ComboBox2.Text = 2) And (ComboBox3.Text = 20) Then
    TextBox5.Text = "S4"
ElseIf (ComboBox2.Text = 2) And (ComboBox3.Text = 30) Then
    TextBox5.Text = "S3"

ElseIf (ComboBox2.Text = 3) And (ComboBox3.Text = 10) Then
    TextBox5.Text = "S5"
ElseIf (ComboBox2.Text = 3) And (ComboBox3.Text = 20) Then
    TextBox5.Text = "S4"
ElseIf (ComboBox2.Text = 3) And (ComboBox3.Text = 30) Then
    TextBox5.Text = "S3"
End If

If Val(TextBox4.Text = "T3") And Val(TextBox5.Text = "S1") Then
    TextBox2.Text = 50
    TextBox3.Text = 175
    TextBox8.Text = 200
    TextBox9.Text = 300
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T4") And Val(TextBox5.Text = "S1") Then
    TextBox2.Text = 50
    TextBox3.Text = 175
    TextBox8.Text = 250
    TextBox9.Text = 300
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T5") And Val(TextBox5.Text = "S1") Then
    TextBox2.Text = 50
    TextBox3.Text = 175
    TextBox8.Text = 300
    TextBox9.Text = 300
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T6") And Val(TextBox5.Text = "S1") Then
    TextBox2.Text = 50
    TextBox3.Text = 200
    TextBox8.Text = 325
    TextBox9.Text = 300
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

```

```

ElseIf Val(TextBox4.Text = "T7") And Val(TextBox5.Text = "S1") Then
    TextBox2.Text = 125
    TextBox3.Text = 225
    TextBox8.Text = 225
    TextBox9.Text = 350
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T8") And Val(TextBox5.Text = "S1") Then
    TextBox2.Text = 150
    TextBox3.Text = 250
    TextBox8.Text = 250
    TextBox9.Text = 350
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ' ****
    ' ****
    ' *****

ElseIf Val(TextBox4.Text = "T3") And Val(TextBox5.Text = "S2") Then
    TextBox2.Text = 50
    TextBox3.Text = 175
    TextBox8.Text = 175
    TextBox9.Text = 200
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T4") And Val(TextBox5.Text = "S2") Then
    TextBox2.Text = 50
    TextBox3.Text = 175
    TextBox8.Text = 225
    TextBox9.Text = 200
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T5") And Val(TextBox5.Text = "S2") Then
    TextBox2.Text = 50
    TextBox3.Text = 175
    TextBox8.Text = 275
    TextBox9.Text = 200
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T6") And Val(TextBox5.Text = "S2") Then
    TextBox2.Text = 50
    TextBox3.Text = 200
    TextBox8.Text = 300
    TextBox9.Text = 300
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T7") And Val(TextBox5.Text = "S2") Then
    TextBox2.Text = 125
    TextBox3.Text = 225
    TextBox8.Text = 225
    TextBox9.Text = 200
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T8") And Val(TextBox5.Text = "S2") Then
    TextBox2.Text = 150
    TextBox3.Text = 250

```

```

        TextBox8.Text = 250
        TextBox9.Text = 200
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ' ****
        ' ****
        ' ****

    ElseIf Val(TextBox4.Text = "T3") And Val(TextBox5.Text = "S3") Then
        TextBox2.Text = 50
        TextBox3.Text = 175
        TextBox8.Text = 225
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T4") And Val(TextBox5.Text = "S3") Then
        TextBox2.Text = 50
        TextBox3.Text = 175
        TextBox8.Text = 275
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T5") And Val(TextBox5.Text = "S3") Then
        TextBox2.Text = 50
        TextBox3.Text = 175
        TextBox8.Text = 325
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T6") And Val(TextBox5.Text = "S3") Then
        TextBox2.Text = 50
        TextBox3.Text = 200
        TextBox8.Text = 330
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T7") And Val(TextBox5.Text = "S3") Then
        TextBox2.Text = 125
        TextBox3.Text = 225
        TextBox8.Text = 250
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T8") And Val(TextBox5.Text = "S3") Then
        TextBox2.Text = 150
        TextBox3.Text = 250
        TextBox8.Text = 275
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ' *****
        ' *****
        ' *****

    ElseIf Val(TextBox4.Text = "T3") And Val(TextBox5.Text = "S4") Then
        TextBox2.Text = 50

```

```

        TextBox3.Text = 175
        TextBox8.Text = 150
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T4") And Val(TextBox5.Text = "S4") Then
        TextBox2.Text = 50
        TextBox3.Text = 175
        TextBox8.Text = 200
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T5") And Val(TextBox5.Text = "S4") Then
        TextBox2.Text = 50
        TextBox3.Text = 175
        TextBox8.Text = 250
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T6") And Val(TextBox5.Text = "S4") Then
        TextBox2.Text = 50
        TextBox3.Text = 200
        TextBox8.Text = 275
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T7") And Val(TextBox5.Text = "S4") Then
        TextBox2.Text = 125
        TextBox3.Text = 225
        TextBox8.Text = 175
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T8") And Val(TextBox5.Text = "S4") Then
        TextBox2.Text = 150
        TextBox3.Text = 250
        TextBox8.Text = 175
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ' ****
        ' ****
        ' ****

    ElseIf Val(TextBox4.Text = "T3") And Val(TextBox5.Text = "S5") Then
        TextBox2.Text = 50
        TextBox3.Text = 150
        TextBox8.Text = 100
        TextBox9.Text = 0
        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

    ElseIf Val(TextBox4.Text = "T4") And Val(TextBox5.Text = "S5") Then
        TextBox2.Text = 50
        TextBox3.Text = 175
        TextBox8.Text = 125
        TextBox9.Text = 0

```

```

        TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ElseIf Val(TextBox4.Text = "T5") And Val(TextBox5.Text = "S5") Then
            TextBox2.Text = 50
            TextBox3.Text = 175
            TextBox8.Text = 150
            TextBox9.Text = 0
            TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ElseIf Val(TextBox4.Text = "T6") And Val(TextBox5.Text = "S5") Then
            TextBox2.Text = 50
            TextBox3.Text = 200
            TextBox8.Text = 175
            TextBox9.Text = 0
            TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ElseIf Val(TextBox4.Text = "T7") And Val(TextBox5.Text = "S5") Then
            TextBox2.Text = 125
            TextBox3.Text = 225
            TextBox8.Text = 100
            TextBox9.Text = 0
            TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ElseIf Val(TextBox4.Text = "T8") And Val(TextBox5.Text = "S5") Then
            TextBox2.Text = 150
            TextBox3.Text = 250
            TextBox8.Text = 100
            TextBox9.Text = 0
            TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ' ****
        ' ****
        ' ****

        ElseIf Val(TextBox4.Text = "T3") And Val(TextBox5.Text = "S6") Then
            TextBox2.Text = 50
            TextBox3.Text = 150
            TextBox8.Text = 0
            TextBox9.Text = 0
            TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ElseIf Val(TextBox4.Text = "T4") And Val(TextBox5.Text = "S6") Then
            TextBox2.Text = 50
            TextBox3.Text = 175
            TextBox8.Text = 0
            TextBox9.Text = 0
            TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

        ElseIf Val(TextBox4.Text = "T5") And Val(TextBox5.Text = "S6") Then
            TextBox2.Text = 50
            TextBox3.Text = 200
            TextBox8.Text = 0
            TextBox9.Text = 0
            TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

```

```

ElseIf Val(TextBox4.Text = "T6") And Val(TextBox5.Text = "S6") Then
    TextBox2.Text = 50
    TextBox3.Text = 225
    TextBox8.Text = 0
    TextBox9.Text = 0
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T7") And Val(TextBox5.Text = "S6") Then
    TextBox2.Text = 125
    TextBox3.Text = 225
    TextBox8.Text = 0
    TextBox9.Text = 0
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)

ElseIf Val(TextBox4.Text = "T8") And Val(TextBox5.Text = "S6") Then
    TextBox2.Text = 150
    TextBox3.Text = 250
    TextBox8.Text = 0
    TextBox9.Text = 0
    TextBox6.Text = Val(TextBox2.Text) + Val(TextBox3.Text) + Val(TextBox8.Text) +
Val(TextBox9.Text)
End If
!*****

If (ComboBox1.Text = "2 Lanes 2 Carriage Way") Then
    TextBox7.Text = 7 * 1 * Val(TextBox2.Text) * Val(Form2.TextBox2.Text) / 1000 + 7
* 1 * Val(TextBox3.Text) * Val(Form2.TextBox6.Text) / 1000 + 7 * 1 * Val(TextBox8.Text) *
Val(Form2.TextBox7.Text) / 1000 + 7 * 1 * Val(TextBox9.Text) * Val(Form2.TextBox8.Text) /
1000

ElseIf (ComboBox1.Text = "3 Lanes 1 Carriage Way") Then
    TextBox7.Text = 10.5 * 1 * Val(TextBox2.Text) * Val(Form2.TextBox2.Text) / 1000 +
10.5 * 1 * Val(TextBox3.Text) * Val(Form2.TextBox6.Text) / 1000 + 10.5 * 1 *
Val(TextBox8.Text) * Val(Form2.TextBox7.Text) / 1000 + 10.5 * 1 * Val(TextBox9.Text) *
Val(Form2.TextBox8.Text) / 1000

ElseIf (ComboBox1.Text = "4 Lanes 2 Carriage Way") Then
    TextBox7.Text = 14 * 1 * Val(TextBox2.Text) * Val(Form2.TextBox2.Text) / 1000 +
14 * 1 * Val(TextBox3.Text) * Val(Form2.TextBox6.Text) / 1000 + 14 * 1 * Val(TextBox8.Text) *
Val(Form2.TextBox7.Text) / 1000 + 14 * 1 * Val(TextBox9.Text) * Val(Form2.TextBox8.Text) /
1000

ElseIf (ComboBox1.Text = "6 Lanes 2 Carriage Way") Then
    TextBox7.Text = 21 * 1 * Val(TextBox2.Text) * Val(Form2.TextBox2.Text) / 1000 +
21 * 1 * Val(TextBox3.Text) * Val(Form2.TextBox6.Text) / 1000 + 21 * 1 * Val(TextBox8.Text) *
Val(Form2.TextBox7.Text) / 1000 + 21 * 1 * Val(TextBox9.Text) * Val(Form2.TextBox8.Text) /
1000

End If

!=====
End Sub

```