Assignment 3: Applications of Python in the field of Reinforced Cement Concrete

DATE :

1.Calculate the length of transition curve on a plain terrain using the following data. Design speed = 65 kmph, Radius of curvature- 220 m. Allowable rate of introduction of superelevation (pavement rotated about its centerline) = 1 in 150, Pavement width including extra widening 7.5m

**2.Calculate 10 years EWL and traffic index value using following data**

|  |  |
| --- | --- |
| **EWL Constant** | **AADT** |
| **330** | **3750** |
| **1070** | **470** |
| **2460** | **320** |
| **4620** | **120** |

Assume 60% increase in traffic in next 10 years. Calculate the thickness of the pavement required if R = 48 and C= 16.

1. **CBR test was conducted for soil subgrade and following results were found. Compacted soil CBR = 6%, Poorly graded Gravels CBR = 12%, Well graded Gravel CBR = 60%, Bituminous surface of thickness 4cm. Assume wheel load as 4085 kg and tyre pressure as 7 kg/cm**

**.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Load (kg)** | **Penetration**  **(mm)** | **Standard**  **Load (kg)** | **CBR (%)** |
| **60** | **2.5** | **1370** | **4.38** |
| **82** | **5.0** | **2055** | **3.99** |

Q.1 INPUT

1. **#To Calculate the length of transition curve**
2. **V= int(input("Enter the value of design speed: "))**
3. **R= int(input("Enter the value of Radius of curvature: "))**
4. **N= int(input("Enter the value of slope: "))**
5. **W= float(input("Enter the value of width of road including extra widening: "))**
6. **emax=float(input("'enter the value for plain terain:"))**

7. ecal= (V\*V/(225\*R))

1. **print("The value of Super elevation:",ecal) if ecal<emax else print(emax)**
2. **Ls=(emax\*N\*W/2)**
3. **print("The length of transition curve:", Ls)**

OUTPUT :

Enter the value of design speed: 65

Enter the value of Radius of curvature: 220 Enter the value of slope: 150

Enter the value of width of road including extra widening: 7.5 Enter the value for plain terain:0.07

The length of transition curve: 39.37500000000001

* 1. **INPUT**
     1. **R = int(input(" Constant R: "))**
     2. **C = int (input (" Constant C: "))**
     3. **import numpy as geek**
     4. **A = int(input ("Total Data Values for EWL Constant: "))**
     5. **B = int(input ("Total Data Values for AADT: "))**
     6. **EWL\_Constant = []**
     7. **AADT = []**
     8. **for i in range (1, A+1):**
     9. **print ("Enter EWL Constant:") # Indent this line**
     10. **A = float (input())**
     11. **EWL\_Constant. append(A)**
     12. **for j in range (1, B+1): # Fix indentation and possible typo (l to 1)**
     13. **print ("Enter AADT: ")**
     14. **B = float (input ())**
     15. **AADT. append (B)**
     16. **product = geek. dot (EWL\_Constant, AADT)**
     17. **# print(" Dot Product :\n", product) # Comment out or fix this line**
     18. **Total\_EWL = product # Add underscore to match usage later**
     19. **print (" Total EWL :", Total\_EWL)**
     20. **print ("EWL after 60 years :", Total\_EWL\*1.6)**

21. TI = 1.35\*(((1.6\* Total\_EWL) + ((product) /2)) \*\*0.11)

22. print ("Traffic Index : ", TI)

23. Thickness = 0.166\*TI\* (99-R)/(C\*\*0.2)

24. print ("Pavement Thickness: ", Thickness, "cm")

OUTPUT :

Constant R: 48

Constant C: 16

Total Data Values for EWL Constant: 4 Total Data Values for AADT: 4

Enter EWL Constant: 330 Enter EWL Constant: 1070 Enter EWL Constant: 2460 Enter EWL Constant: 4620 Enter AADT: 3750

Enter AADT: 470

Enter AADT: 320

Enter AADT: 120

Total EWL : 3082000.0

EWL after 60 years : 4931200.0 Traffic Index : 7.577910657490486

Pavement Thickness: 36.847136933326986 cm

* 1. **INPUT**
     1. **p = float(input(" Load in kg: ")) # Get load value**
     2. **tyre\_pressure = float(input(" Tyre pressure kg/cm^2: ")) # Rename to avoid overwriting 'p'**
     3. **M = int(input("Total Number of layers in a given Pavement : ")) 4. pi = 3.14159**

1. **CBR = []**
2. **for i in range(1, M + 1):**
3. **print("California Bearing Ratio of Material in %")**
4. **CBR\_value = float(input())**
5. **CBR.append(CBR\_value)**
6. **T = ((1.75 \* p) / (CBR\_value) - (p / (tyre\_pressure \* pi))) \*\* 0.5 # Use lowercase 'p'**
7. **print("Thickness Above this layer: ", T, "cm")**
8. **print("Given that bitumen layer of 4 cm") OUTPUT :**

Load in kg: 4085

Tyre pressure kg/cm^2: 7

Total Number of layers in a given Pavement : 3

**California Bearing Ratio of Material in %4.**

**Thickness Above this layer: 38.031276487723645 cm California Bearing Ratio of Material in %**

**6**

**Thickness Above this layer: 31.712799015896838 cm California Bearing Ratio of Material in %**

**12**

**Thickness Above this layer: 20.247776538573337 cm Given that bitumen layer of 4 cm**