Faulty of Engineering and Technology

Civil Engineering Department

Construction Materials Laboratory

ENCE215

Experiment :

" Asphalt Tests : Penetration Test "

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Date of performing the experiment : 12/8/2020

Date of submitting the experiment : 21/8/2020

Introduction :

Penetration test on bitumen is a measure of hardness or consistency of bituminous material .

Penetration value is the vertical distance traversed or penetrated by the point of a standard needle into the bituminous material under specific conditions of load, time and temperature. This distance is measured in one tenths of a millimeter.

Purpose :

1. Consistency of bituminous material
2. Suitability of bitumen for use under different climatic conditions and various types of construction .

Materials and Equipment's :

Equipment	The name of it :	Equipment	The name of it :
 Figure 1	**Penetration device**	 Figure 2	**Bitumen samples**

" Table 1 "

Procedure :

1- A sample was taken from the container and tested by a standard needle of a total load of 100 g that was applied until it made contact with the surface of the bitumen sample at a temperature of 25 Cofor 5 seconds.
2- The indicator was on (0) on the gradual disk of machine.
3- The machine was run, the needle penetrated a distance of the sample.
4- After the machine automatically stopped, the penetration percentage (distance of penetration) was reported from the gradual disk.
5- The previous procedure was repeated for several times on the other two samples.

Data and Calculations :

Sample No.	Penetration values (mm)		Average (mm)
	1	2	
1	3.3	3.7	3.5
2	1.9	2.1	2.0

Results and Conclusion :

The needle penetrated the three samples about 3.5 and 2.0 mm respectively from the surface of the sample. This result indicates that the three bitumen samples are solid, since the penetration did not exceed 8 mm.

Penetration test is a commonly adopted test on bitumen to grade the material in terms of its hardness. Grading of bitumen helps to assess its suitability in different climatic conditions and types of construction. It is clear that in warmer regions, lower penetration grades are preferred to avoid any softening whereas higher penetration grades are used in colder regions to prevent the occurrence of any excessive brittleness.