



Late Shri. Vishnu Waman Thakur Charitable Trust's

VIVA Institute of Technology

Approved by AICTE, New Delhi, DTE, Government of Maharashtra, Affiliated to University of Mumbai
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Civil Engg. Department

Topic Name:	TRANSPORTATION ENGINEERING I
Name of the Guest Speaker:	Mr. Vivek Mamdapur
Designation:	Asst. Professor
Organization/Institution:	M.G.M College of Engineering
Date:	28/09/18
Time:	11.00 Onwards

Programme/ Summary Details:

Highway engineering is an engineering discipline ranching from civil engineering that involves the planning, design, construction, operation, and maintenance of roads, bridges, and tunnels to ensure safe and effective transportation of people and goods. Use of bituminous concrete and cement concrete are the most important developments. Various advanced and cost-effective construction technologies are used. Development of new equipment help in the faster construction of roads. Many easily and locally available materials are tested in laboratories and then implemented on roads for making economical and durable pavement.

Flexible pavements will transmit wheel load stresses to the lower layers by grain-to-grain transfer through the points of contact in the granular structure. The wheel load acting on the pavement will be distributed to a wider area, and the stress decreases with the depth. Taking advantage of this stress distribution characteristic, flexible pavements normally have many layers. Hence, the design of flexible pavement uses the concept of a layered system. The lower layers will experience a lesser magnitude of stress and low-quality material can be used. Flexible pavements are constructed using bituminous materials. These can be either in the form of surface treatments (such as bituminous surface treatments generally found on low-volume roads) or, asphalt concrete surface courses (generally used on high-volume roads such as national highways). Flexible pavement layers reflect the deformation of the lower layers onto the surface layer (e.g., if there is any undulation in the subgrade then it will be transferred to the surface layer). In the case of flexible pavement, the design is based on the overall performance of flexible pavement, and the stresses produced should be kept well below the allowable stresses of each pavement layer.

Rigid pavements have sufficient flexural strength to transmit the wheel load stresses to a wider area below. Compared to the flexible pavement, rigid pavements are placed either directly on the prepared subgrade or on a single layer of granular or stabilized material. Since there is only one layer of material between the concrete and the subgrade, this layer can be called a base or sub-base course. In rigid pavement, the load is distributed by the slab action. Rigid pavements are constructed by Portland cement concrete (PCC) and should be analyzed by plate theory instead of layer theory, assuming an elastic plate resting on a viscous foundation. Plate theory is a simplified version of layer theory that assumes the concrete slab is a medium-thick plate that is plane before loading and remains plane after loading. Bending of the slab due to wheel load and temperature variation and the resulting tensile and flexural stress.



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