

# MATERIALS OF FLEXIBLE PAVEMENTS

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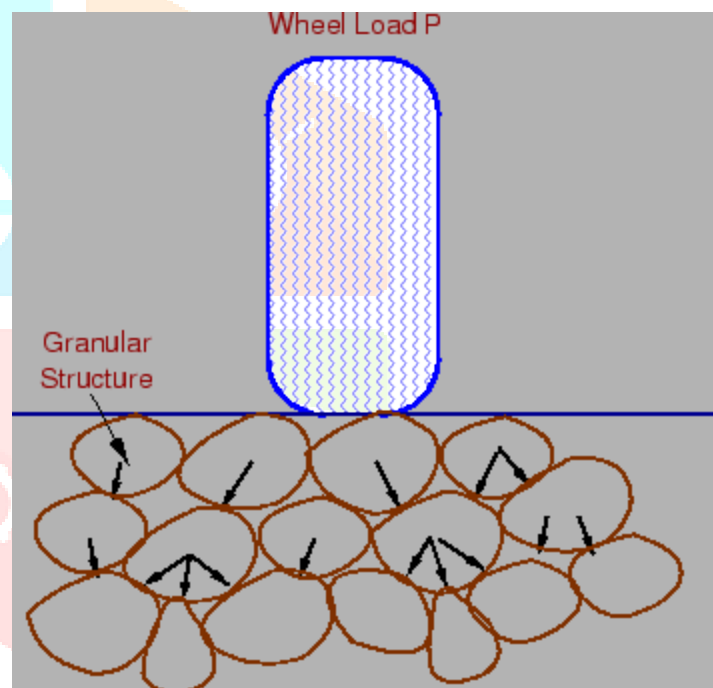
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**ABSTRACT:** In this paper, there is a study of materials used in different layers of flexible pavements. There are some new materials which are used by Civil Engineers now-a-days. Materials of highway should be according to the specifications. Each property of materials should be accurate. Materials for every layer of highway should be according to the need of strength of load bearing capacity. The flexibility of this type of road depends on the distribution of forces from the surface through the layers.

**Keywords:** Sub-base course, Base course, wearing course, waste plastic.

## INTRODUCTION

Wheel load stresses are transmitted to the lower layers by grain-to-grain transfer through the points of contact in the granular structure.

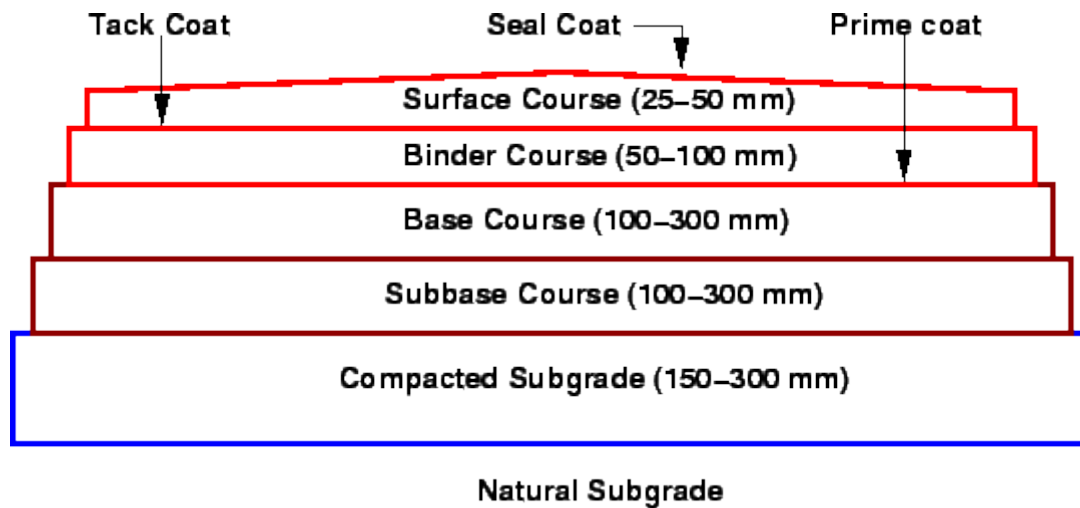


**Figure 1:** Load transfer in granular structure

The wheel load acting on the pavement will be distributed to a wider area, and the stress decreases with the depth. Taking advantage of these stress distribution characteristic, flexible pavements normally has many layers. Hence, the design of flexible pavement uses the concept of layered system. Based on this, flexible pavement may be constructed in a number of layers and the top layer has to be of best quality to sustain maximum compressive stress, in addition to wear and tear. The lower layers will experience 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 on to the surface layer (e.g., if there is any undulation in sub-grade then it will be transferred to the surface layer). In the case of flexible pavement, the design is based on overall performance of flexible pavement, and the stresses produced should be kept well below the allowable stresses of each pavement layer.

Components of a flexible pavement:

layers of a conventional flexible pavement includes seal coat, surface course, tack coat, binder course, prime coat, base course, sub-base course, compacted sub-grade, and natural sub-grade.



#### MATERIALS FOR SUB-BASE COURSE:

In highway engineering, **subbase** is the layer of aggregate material laid on the subgrade, on which the base course layer is located. It may be omitted when there will be only foot traffic on the pavement, but it is necessary for surfaces used by vehicles.

Sub-Base course is the layer (or layers) under the base layer. A sub-base is not always needed. A proper sub-base consists of various sizes of crushed stone aggregate, commonly known as crusher run. Depending on the sub soils on your site you may need 8-12 inches of various sizes of sub-base.

With well drained sub soils, without movement, added sub-base materials may be sufficient, al with proper pitch & grade.

If the sub-base is knowingly sufficient, grading & compaction with vibratory roller or plate compactor in small areas, may be all that is necessary.

- Crushed stone
- Crushed slag
- Concrete
- Slate

#### MATERIALS FOR BASE COURSE:

If there is a sub-base course, the base course is constructed directly above this layer. Otherwise, it is built directly on top of the sub-grade. Typical base course thickness ranges from 100 to 150mm. The base course of road serves as the essential basic segment of the adaptable asphalt. It conveys the forced wheel load to the asphalt establishment, the sub-base, as well as the sub-grade. The materials making the base course are select hard and tough totals, which generally fall into two fundamental classes: balanced out and granular. The balanced out bases ordinarily consist of crushed or uncrushed total bound with a stabilizer, for example, bitumen.

#### MATERIALS FOR WEARING COURSE:

- Bitumen
- Aggregates
- Tar

#### Use of Waste Plastic in Construction of Flexible Pavement:

There is an important material which is being use now-a-day is known as polymer modified bitumen. Due to many reasons plastic waste is used as construction material for flexible pavement. A modified technique was developed for construction of flexible pavements. In flexible pavement construction plastic coated aggregate showed better binding property. It has less wetting property and voids. The aggregate when coated with plastics improved its quality with respect to moisture absorption. The coating of plastic decreases the moisture absorption and helps to improve the quality of the aggregate and its performance in the flexible pavement. The waste plastic is used as the stiffen binders for reducing the rutting, thermal cracking, stripping, cost of maintenance of pavement. It improves the fatigue resistance, bituminous pavement durability and provides clean environment. Use of this mix for road construction helps to use plastics waste. Once the plastic waste is separated from municipal solid waste, the organic matter can be converted to use.

**REFERENCES**

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**AUTHOR BIOGRAPHY**

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