VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"Jnana Sangama", Belagavi-560014, Karnataka

PROJECT (PHASE -02)
(18CVP78)

"A LABORATORY INVESTIGATION ON BITUMINOUS CONCRETE PREPARED WITH FLYASH AS A FILLER MATERIAL"

SUBMITTED IN PARTIAL FULFILLMENT FOR THE AWARD OF DEGREE OF

BACHELOR OF ENGINEERING
IN
CIVIL ENGINEERING

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CERTIFICATE

This is to certify that, project report of entitled " **A LABORATORY INVESTIGATION OF BITUMINOUS CONCRETE PREPARED WITH FLYASH AS A FILLER MATERIAL**" has been successfully carried out by THRIVENI S [1SV19CV031], RAKESH L P [1SV20CV403], SURYA M N[1SV19CV028], TEJA K G [1SV18CV035] in partial fulfillment for the project report of **Bachelor of Engineering in Civil Engineering** of the **Visvesvaraya Technological University, Belagavi** during the academic year **2022-23.** It is certified that all the corrections/suggestions indicated for internal assessments have been incorporated in the report. The Project report has been approved as it certifies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

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ABSTRACT

This work will be carried out to study the bitumen concrete mix added with different percentage of fly ash. Various physical tests were conducted on virgin and modified. bitumen to evaluate its physical properties. Marshall Test was conducted on bituminous mix prepared using modified and unmodified bitumen and the effects were analyzed and compared. These study will show that increase in the percentage of fly ash improves the physical properties of virgin bituminous mix when using as filler. Further it is expected to shown that increase in the percentage of fly ash improves Marshall Stability & flow values in the bituminous mix.

This study is about the effect of fly ash as filler on bituminous mix design under various condition. The main purposes of this project is to study the possibility of using fly ash as mineral filler in bituminous paving mixes where in general stone dust are used. Fly ash from Barapukuria Coal Power Plant has been used in the present experimental work. Suitable aggregate grading is selected for bituminous mixes. Standard Marshall Mix design procedure is followed in the design by using standard filler stone dust and testing of those mixes to determine the density, stability, flow, voids in mixes and optimum bitumen content. By this optimum bitumen content, mixes are prepared by replacing standard filler stone dust with fly ash at levels 25%, 50%, 75% and 100% by weight of total filler. The mixes are tested to obtain optimum fly ash content. By fixing optimum bitumen content and fly ash content mixes are prepared to observe the effect of water submergence on compacted mixes where compacted mixes are submerged in water for 5, 10, 15 and 20 days. In this study, it is found that 25% fly ash and 75% stone dust by total weight of filler satisfy the mix design criteria for medium traffic condition. So 25% fly ash by total weight of filler can be used as optimum. Again, compacted mixes, prepared using optimum fly ash content and optimum bitumen content, can be submerged in water for 10 days at room temperature. So compacted mixes, prepared using 25% fly ash by total weight of filler and 5.56% OBC, are suitable for flood plain areas where roads are submerged in water for 10 days.

Keywords: Optimum Bitumen Content; Optimum Fly Ash content; Stone Dust; Water Effect

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3.2.4MARSHALL STABILITY TEST

To determine the Marshall stability and Optimum bitumen content of the given mix as per ASTM D 1559.

Apparatus:

1. Mould assembly
2. Sample extractor
3. Compaction pedestal and hammer
4. Proving ring
5. Breaking head
6. Loading machine
7. Flow meter (dial gauge)

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Procedure:

Preparation of Test Specimen:

1. 1200 grams of aggregates blended in the desired proportions is measured and heated in the oven to the mixing temperature.
2. Bitumen is added at the mixing temperature to produce viscosity of 170 ± centi stokes at various percentages.
3. The materials are mixed in a heated pan with heated mixing tools.
4. The mixture is returned to the oven and reheated to the compacting temperature (to produce viscosity of 280±30 centi-stokes).