Review paper on
Use of RHA as mineral filler in hot mix SDBC

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Abstract - *This paper summarizes the ongoing researches about Use of RHA as mineral filler in hot mix asphalts (SDBC). Many researches regarding the addition of filler have been laid down by different scholars. Many studies regarding the addition of OPC and waste materials like cement kiln dust ,lime and rice husk ash were studied and then their effects were also analyzed and laid down to a proper conclusion. It was concluded that by use of different types of fillers increase the life of pavement, increased marshal stability values, lowered pavement deformation, increase fatigue resistance, provide better adhesion between asphalt and aggregates and increase in durability of flexible pavement.*

In this study, it was investigated to use of the RHA in the hot mix asphalts (SDBC) as mineral filler in place of conventional filler.[1]

Key Words: Rice husk ash, lime, marshal stability test, stability value and flow Characteristics, flexible pavement, hot mix asphalts.

1. INTRODUCTION

The quality of roads dictates the economy of a country and hence the quality of our lives. Roads are vital for the transport of the goods and passengers. In India, road transport carries approximately 85% of passenger traffic and 70% of freight transport. But the construction of highways involves huge amount of the investment and mainly sixty percent of the highway project cost is associated with the pavement construction. Pavement is a durable surfacing of a road, airstrip, or similar area and the primary function is to transmit loads to the sub-base and underlying soil sub grade. Around ninety percent of the Indian Highways have a covered surface with bituminous layers which are constructed and maintained by using naturally available road aggregates and bitumen, a petroleum product, which being mixed at high temperatures to produce hot mix asphalt. Mix design for the different layers of the pavement can have a major impact on the performance, cost and sustainability of the bituminous surfaces. The need hence arises in making comprehensively efficient flexible pavements that may serve as an asset to the economy of a nation. In India, various techniques have been put forward in the field of highway engineering. There is hence an outmost urgency in bringing about more new ideas in this aspect so that a nation that is dependent mostly on its highways may pursue towards a better tomorrow.

Semi dense bituminous concrete (SDBC) shall be used as a wearing course & shall not be laid directly over WBM or any granular base. the shall consist of mineral aggregates and appropriate binder mixed in a hot mix plant and laid with a paver on a previously prepared base in accordance with the specification and confirming to the lines , grades and cross sections. [1]

Rice husk is one of the main agricultural residues obtained from the outer covering of rice grains during the milling process. It constitutes 20% of the 500 million tons of paddy produced in the world. It's an agriculture waste and when waste are to be burned and to depose it in land filling, it's not a ecofriendly processes as they pollute the land and the air. RHA is a highly pozzolanic material, contains silica and surface specific area. That's why many of the field in civil engineering it's being used in soil engineering and in highway construction in flexible pavements as mineral filler. It is discovered that RHA is a highly pozzolanic material contains more % of silica, its rich in amorphous silica about 86% in RHA in this study.

Filler play important role in property of SDBC mix, Fillers increases the stiffness of the asphalt mortar matrix. Fillers also affect workability, moisture resistance, and aging characteristics of HMA mixtures. Different types of mineral fillers may be used in the HMA mixes such as stone dust, ordinary Portland cement (OPC), slag, fly Ash, hydrated lime and rha etc. [3]

2. Function of different highway materials

Following materials are used in SDBC given below-

2.1Fine Aggregates

Fine aggregates for SDBC consists of crushed or naturally occurring mineral material or a combination of the two, passing the 2.36mm Indian standard sieve and retained on the 75 micron Indian standard sieve. Aggregates should be clean, hard, durable, and free from dust, dry and soft or friable matter, organic or other deleterious matter. Fine aggregates: The fine aggregates shall be all as specified in Clause 508.2.3[2]

2.2Coarse Aggregates

The coarse aggregates for the SDBC mix consists of crushed rock, crushed gravel or other hard material retained on the

2.36mm sieve. The aggregates should satisfy the physical requirements as specified in table, see Table 1 (Ref: MOSRT&H Specifications for Road and Bridge Works for Semi Dense Bituminous Concrete). The coarse aggregates shall be generally as specified in Clause 508.2.2, except that the aggregates shall satisfy the physical requirements of Table 500-14Further specifications of Gradation of stone Aggregate for SDBC as per MORTH [2] Specification (Table 500-15) of aggregates are given in Table 2

2.3Bitumen

The bitumen for the SDBC is paving bitumen of penetration Grade complying with Indian Standard Specifications for "Paving Bitumen" In our study VG30 grade bitumen with 60-70 penetration grade bitumen is used throughout the study. **(**Ref: MOSRT&H **508.2.1.**) Specifications for Road and Bridge Works for Semi Dense Bituminous Concrete IS-73 2006)[4] The test properties of the bitumen are listed below inTable-2.3.1

Table -1: Section 500 Table 500-14[2] Physical Requirements for Course Aggregate for Semi Dense Bituminous Concrete Pavement Layers.

Description test	**Specification as 'MORTH'**	**Test method**	**Test result**
1.Aggregate crushing value %	Max. (10-25) %	**IS** – 2386 P(IV)	14.90
2.Aggregate impact value %	Max. (27) %	**IS** – 2386 P(IV)	17.55
3.Loss Angelis abrasion test %	Max. (35) %	**IS** – 2386 P(IV)	15.12
4.Water absorption test %	Max. 2 %	**IS** – 2386 P(IV)	0.162
5.stripping	Max. Retained coating (95%)	**IS** – (6241-1971)	98 %
6.Flakiness index %	Max. 15 %	**IS** – 2386	14%
7.Elongation index %	Max. 15 %	**IS** – 2386	13.5%
8. SPECIFIC GRAVITY		**IS** – 2386	*2.75* Avg.

Figure 1 Gradation of aggregate sample

Table -2: Gradation of stone Aggregate for SDBC as per MORTH Specification (Table 500-15)[2]

Grading	1	2
Nominal aggregate size	13 mm	10 mm
Layer thickness	35-40 mm	25-30 mm
IS Sieve1 (mm)	Cumulative % by weight of total aggregate passing	
37.5	-	-
26.5	-	-
19	100	-
13.2	90-100	100
9.5	70-90	90-100
4.75	35-51	35-51
2.36	24-39	24-39
1.18	15-30	15-30
0.6	-	-
0.3	9-19	9-19
0.15	-	-
0.075	3-8	3-8
Bitumen content % by mass of total mix	Min 4.5	Min 5.0

Grading of SDBC as per 'MORTH'						
Sieve size (mm)	10 mm (A)	6 mm (B)	Dust mm (C)	Filler (D)	0.39A+ 0.27B+ 0.32C+ 0.02D	'MORTH' Specified
13.2	100	100	100	100	100	100
9.5	91.7	100	100	100	96.763	90 - 100
4.75	19.2	31.6	100	100	50.02	35 – 51
2.36	1.2	16.5	78.5	100	32.04	24 – 39
1.18	0.5	3.5	54.5	100	20.58	15 – 30
300 µ	-	0	22.5	100	9.28	9 – 19
75 µ	-	0	4.0	95	3.18	3 - 8

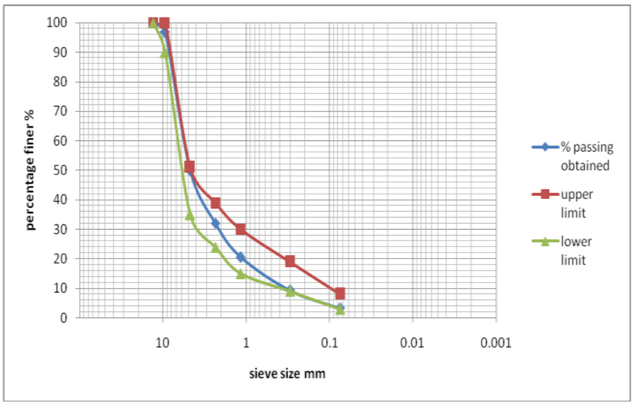

Figure.2 Gradation curve (sieve analysis of Aggregate)

Table-3: Test result in laboratory of the Bitumen used throughout the study:

SR. No.	Description	Test Method	Test Result	Remarks
1	Specific Gravity	IS 1202	1.025	-
2	Penetration	IS 1203	60.5	60/70 grade Bitumen
3	Softening Point	IS 1205	55^{0} C	-
4	Viscosity at 135 ^{0}C	IS 1206	380 cst	-
5	Ductility	IS 1208	92.2	-

2.4Filler –

Fillers have plays a significant role on the properties of HMA mixtures particularly in terms of air voids, voids in mineral aggregate. Fillers increase the stiffness of the asphalt mortar matrix. Fillers also affect workability, moisture resistance, and aging characteristics of HMA mixtures. Different types of mineral fillers may be used in the HMA mixes such as stone dust, ordinary Portland cement (OPC), slag, fly Ash, hydrated lime and RHA etc. Filler shall, be generally as specified in (Clause 508.2.4). 2 per cent by total weight of aggregate, of hydrated lime shall be added without additional cost [2]

Rice husk is one of the main agricultural residues obtained from the outer covering of rice grains during the milling process. It constitutes 20% of the 500 million tons of paddy produced in the world. It's an agriculture waste and when waste are to be burned and to depose it in land filling, it's not a ecofriendly processes as they pollute the land and the air. see Table-4 The chemical composition of typical rise husk ash.

RHA is utilized in semi dense bituminous (SDBC) concrete as mineral filler.

The rice husk ash as filler in bituminous mixes the possibility of using Rice husk ash –a waste product from rice as a filler material in bituminous mixes. The marshal design criteria are used to establish its suitability.

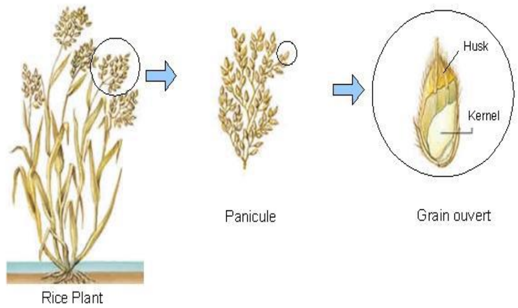

Figure 3. Rice husk

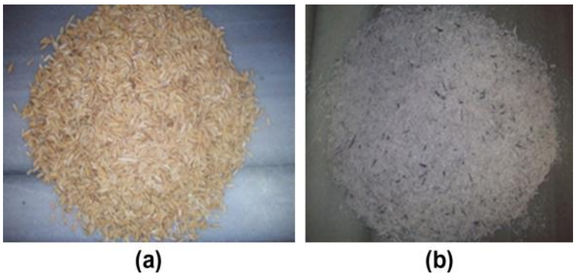

Figure 4. (a) Raw RH & (b) Burnt RHA

As per MORTH [2] Specification (Sec 505.2.4) Filler shall consist of finely divided mineral matter such as rock dust, hydrated lime or cement approved by the Engineer. The use of RHA should be encouraged because of its very good anti-stripping and antioxidant properties.

Table-4: The chemical composition of typical rise husk ash is as follows:

Chemicals	%
Silicon dioxide (SIO_2)	86.66
Aluminium, oxide (AL_2O_3)	2.48
Iron oxide (FE_2O_3)	1.10
Calcium oxide (CAO)	1.75
Magnesium oxide (MgO)	1.08
Carbon dioxide ($9CO_2$)	0.51
Loss on ignition	3.80
Potassium (K_2O)	1.4
Sodium (NA_2O)	0.1

3. Status of ongoing researches

Although many researchers have studied the effects of RHA in concrete mixtures but very little study has been a done to utilize RHA into SDBC mixtures.

3.1 RHA in Asphalt Concrete

During the last few decades the developments on the analysis of asphalt mixes with RHA is developed.

R. G.N.Yasanthi, et al (2016) [9] - studied the performance of waste materials in hot mix asphalt concrete. This study attempts to examine the behavior of Hot Mix Asphalt (HMA) concrete when selected waste materials, namely carbonized wood saw dust, PET & hot mix asphalt waste, are introduced & recommends the suitable replacement percentages. The recommended replacement & addition rates were established by considering the Marshall properties. The results of the study reveal that, the wood saw dust carbonized in oxygen-less condition can be used to replace the traditional filler in HMA concrete up-to 2.74% of the total aggregate weight. In this study PET fibers of 30 mm length were used & up-to 2% of the total aggregate weight Marshall Properties showed an increasing trend. In the third part of the study old HMA concrete removed from 2 year old highway is tested suitability. With addition of reduced amount of bitumen satisfactory Marshall Properties were achieved. The cost reductions of 9.5% & 16.6%, compared to HMA made from virgin materials, were achieved in the case of adding carbonized wood saw dust & reusing HMA waste respectively. Cost & the additional bitumen needed for the reusing HMA waste should be based on the characteristics of the HMA waste sample.

R. Mistry et al (2016) [10] – studied the effect of using fly ash (FA) in asphalt mixture as replacement of common filler. In view of the same, samples were prepared for different bitumen content (3.5–6.5% at 0.5% increments) by using 2% hydrated lime (HL) in control mix as well as varying percentage of FA ranging from 2 to 8% as alternative filler in modified mixes. The optimum bitumen content (OBC) was then determined for all the mix by Marshall Mix design. Experimental results indicate higher stability value with lower OBC for the mix having 4% FA as optimum filler content in comparison with conventional mix & standard specification. So this study discusses the feasibility of using FA as alternative filler instead of HL in asphalt concrete mix by satisfying the standard specification.

Banerjee, et al (2016)[11] - studied the effective way of utilization of rise husk ash in hot mix asphalt. Now-a-days utilization of waste product in construction industry is going on rapidly. One such types of agro-industrial waste product is Rice Husk Ash (RHA), produced abundantly in rice mills from the burning of Rice Husk (RH). In this study RHA has been utilized in Hot-Mix-Asphalt (HMA) concrete in two different ways. Firstly RHA is used in HMA as mineral filler by partial replacement (1%, 2%, 3% and 4%) of Stone Dust which was used as conventional filler. Secondly RHA is used to modify the normal bitumen (80/100) by three different proportions (10%, 20% and 30%) & then these three types of modified bitumen were used to prepare HMA. Now with these two types of mixes Marshall Tests & Fatigue Tests were carried out. The mix in which RHA is used as filler (up to 3%) has shown the similar Marshall stability values as compared to conventional mix but the optimum bitumen content has been increased by addition of more RHA into the mix. Also the fatigue life of this mix is similar up to the addition of 2 % RHA as filler in comparison with conventional mix & then the fatigue life is reduced with addition of more RHA. The second type of mix in which RHA-Modified bitumen is used, had shown higher stability values than conventional mix up to 20% RHA-modification. In this mix the optimum bitumen content is also reduced with 10% & 20% modified bitumen & is similar for 30% modified bitumen. The fatigue life is observed considerably enhanced by the mixes with 10% & 20% modified bitumen but it was less for 30% modified bitumen. So RHA can be effectively incorporated into asphalt mix as bitumen modifier & also as mineral filler up to certain limits.

M.Arabani, et al (2015)[12] – studied the laboratory investigation of hot mix asphalt containing waste material. It has been recognized with growing concern that agricultural & industrial wastes are increasingly produced in large volume. In order to reduce environmental hazards & conserve natural resources, the use of waste materials in highway pavements would be extremely effective in terms of recycling waste materials. The main purpose of this study is to investigate the effects of waste materials as filler on the performance of hot mix asphalt (HMA) mixtures. HMA mixtures containing waste glass powder (WGP), waste brick powder (WBP), rice husk ash (RHA) & stone dust (control mixture) was fabricated & the optimum asphalt binder content was determined for each mixture. The properties of HMA mixtures were investigated by Marshall, indirect tensile stiffness modulus & indirect tensile fatigue tests. The results indicated that WGP & WBP mixtures exhibit higher fatigue life & better performance than other mixtures. In addition, it is determined that there was no considerable difference in the performance of RHA mixture & control mixture.

B.H.Goh, et al (2014)[13] – studied on the experimental results on the utilization of Rice Hush Ash (RHA) as a replacement for mineral filler in asphaltic concrete pavement in Malaysia. Asphaltic concrete mixes containing RHA at different amounts & control specimens were prepared in accordance to Marshall Mix design, and their performance on stability, flow & bulk density are evaluated. Optimum binder content (OBC) & voids analysis are also conducted to compare performance of RHA at different contents. Results reveal that all RHA mixes have satisfied the Malaysian Public Works Department (JKR) specification on wearing course in regard with Marshall Stability & Flow, especially RHA-75. This material is potentially to be used as partial or full substitution of mineral filler (stone dust) in pavement construction

A.Sadeeq, et al (2014)[14] - presented recycle of Reclaimed Asphalt Pavement (RAP) with Rice Husk Ash (RHA) blends as Filler. Large quantities of agricultural waste are generated daily, and their safe disposal raised much global concern. The popular trends in the stabilization or modification of construction materials, especially soil, have resulted in innovative techniques of utilizing the solid waste materials. The researcher presents an experimental investigation into the use of Rice Husk Ash (RHA) as filler to replace Ordinary Portland Cement (OPC) in Reclaimed Asphalt Pavement (RAP). Results of preliminary tests on RAP showed that its properties for pavement mix design were below the standard specification for road works. For correction, RAP was reconstituted with fresh aggregate. Rice Husk Ash (RHA) is used as partial replacement for Ordinary Portland Cement (OPC). Marshall Stability tests are performed on various mixes to investigate the pavement performance indices of the blended materials. The most effective combination of mix constituents that meets all design requirements is 70% RAP, 27% fresh aggregate & 3% mineral filler. An optimum value of 25% RHA filler replacement for OPC is obtained. Indirect tensile strength test results indicated that the use of RHA as filler contributes more to crack resistance of recycled asphalt pavement than OPC filler.

U.H.Onyeiwu, et al (2014)[15] - investigated the use of RHA as filler in Asphalt concrete pavement. Asphalt mix design was carried out using Marshall Stability method to test the performance of the materials in terms of its known engineering properties. Several trial mixes with bitumen contents of 4.5%, 5.5%, 6.5% and 7.5% are produced in order to obtain the OBC. This investigation focuses on the partial replacement of the cement by RHA in the obtained OBC in the following order 0 %(control), 5%, 7.5%, 10%, 12.5%, 15%, 17.5%, 20%, 22.5%, & 25%. The total 42 mix specimens are produced for the experiment. 12 of these specimens are compacted with each percentage of bitumen content, to determine the optimum bitumen content, and 30 specimens are produced to determine the optimum rise husk ash content in terms of asphalt concrete strength. From the Marshall Stability- flow test & density-void analysis, results obtained show that the performance of mix containing 0%(RHA) control have stability, flow, compacted density of mix, void in mix, void in mineral aggregates, & VFB as 6.7 kn, 3 mm, 1.49gm/cm^3, 39.4%, 47.27% & 16.63% at an OBC of 5.5%. The sample prepared with 10% RHA have stability, flow, CDM, VIM, VMA and VFB of 7.63%, 2.19 mm, 1.78gm/cc, 28.23%, 36.77% & 23.23% respectively at an OBC of 5.5% which satisfied the provision in the standard specification requirement of Marshall criteria by Asphalt Institute (1979).Thus for maximum strength, 10% RHA is recommended as partial replacement of cement as filler in Asphalt Concrete mix.

Abdulfatai Adinoyi Murana, et al (2014) [16] – investigated the partial replacement of cement with rice husk ash (RHA) as filler in asphalt concrete design. This work focused on the use of Rice Husk Ash (RHA) as filler in Hot Mix Asphalt (HMA). HMA design is carried out using Marshall Stability method. Several trial mixes with bitumen contents of 4.5% to 7.5% are produced to obtain the Optimum Bitumen Content (OBC). The investigation focuses on the partial replacement of cement with RHA using the obtained OBC in the following order 0%, 5%, 7.5%, 10%, 12.5%, 15%, 17.5%, 20%, 22.5%, & 25%. A total of forty-two (42) mix specimens are prepared, twelve (12) of these are compacted at each percentage of bitumen content to determine the OBC & 30 specimens are used to determine the optimum RHA content in terms of the HMA strength. From the Marshall Stability-flow test analysis, the sample prepared with 10% RHA as filler with an OBC of 5.5% satisfied the provision of the Standard Specification requirement by Asphalt Institute.

M.Jamil, et al (2013) [17]- studied the Rice husk ash (RHA) is an established supplementary cementitous material (SCM). Extensive research has been carried out to incorporate RHA as a SCM in casting concrete & mortar. RHA contributes in two fold of effects in concrete or mortar; i.e. filler effect and Pozzolanic effect. Replacement percentages of RHA used in various previous studies are chosen arbitrarily like 5%, 10%, & 20% & so on to determine the total effect of RHA. But the unique filler effect or Pozzolanic effect of RHA in cementitous system is yet to be investigated comprehensively by the scientific community. This study is carried out to find the maximum Pozzolanic (chemical) contribution of RHA in cementitous system in terms of replacement percentage. The determination is analytical & based on the hydration reaction of cement & the Pozzolanic reaction of RHA with the hydration product. This study determines the chemical contribution of RHA on the basis of replacement percentage of RHA. The replacement percentage is determined as approximately 14.3% for ASTM type-I cement with 55% C_3S & 19% C_2S. This percentage can vary with the change of RHA composition or type of cement used. All the results found in this study are theoretical & based on the chemical reactions in the hydration process of cement. Results may also vary depending upon the percentage of C_3S and C_2S present in cement.

Viet-Thien-An Van, et al (2013) [18]- investigated the effects of grinding on the rice husk ash (RHA) microstructure, specific surface area (SSA), pore volume and water absorption capacity. The Pozzolanic reactivity of RHA subjected to different grinding periods and of silica fume (SF) has been evaluated by determination of the accelerated Pozzolanic strength reactivity index in mortar & the portlandite content in cement pastes. RHA samples contain macro- & mesopores. Grinding partly collapses the porous structure of RHA & reduces SSA. There is an optimum grinding time/fineness of RHA for maximum compressive strength. Despite having a higher SSA, RHA consumes less portlandite but induces similar mortar compressive strength compared to SF. Because of the mesoporous structure, ground RHA can absorb an amount of aqueous phase to decrease the effective water content. Moreover, calcium ions have access to internal surface of RHA particles, enhancing the Pozzolanic reactivity of RHA.

R. Tomar, et al (2013) [19] – studied the effect of fillers on bituminous paving mixes. Construction of highway involves huge outlay of investment. A precise engineering design may save considerable investment; as well as reliable performance of the in-service highway can be achieved. Two things are of major considerations in this regard pavement design & the mix design. A good design of bituminous mix is expected to result in a mix which is adequately strong, durable & resistive to fatigue and permanent deformation & at the same time environment friendly & economical. A mix designer tries to achieve these requirements through a number of tests on the mix with varied proportions of material combinations & finalizes the best one. This often involves a balance between mutually conflicting parameters. Bitumen mix design is a delicate balancing act among the proportions of various aggregate sizes & bitumen content. For a given aggregate gradation, the optimum bitumen content is estimated by satisfying a number of mix design parameters. Fillers play an important role in engineering properties of bituminous paving mixes. Conventionally stone dust, cement & lime are used as fillers. An attempt has been made in this investigation to assess the influence of non-conventional & cheap fillers such as brick dust & silica fume in bitumen paving mixes. It has been observed as a result of this project that bituminous mixes with these non-conventional fillers result in satisfactory Marshall Properties though requiring a bit higher bitumen content, thus substantiating the need for its use. The fillers used in this investigation are likely to partly solve the solid waste disposal of the environment.

S.Karahancer, et al (2013) [20] - reported on the use the rice husk ash (RHA) in the hot mix asphalt as mineral filler. For this purpose, four different serial asphalt concrete samples are produced using limestone (LS) in different proportions 2% - 5% as mineral filler. The amount of optimum bitumen & the value of Marshall Stability (MS) are determined with MS test for the samples. Choosing the series of asphalt having 5% filler which has given the highest stability RHA is changed with LS filler in the rate of 25%, 50%, 75%, & 100%. After that MS test is conducted on the produced samples & the results are evaluated. As a result, it has come in view that RHA can be used as mineral filler in the asphalt concrete. From the test the observed the highest MS value has seen on samples prepared with 2.5% RHA & 2.5% LS. MS value also increased by percentage of 2.26 in samples prepared with 1.25% RHA & 3.75 LS.

J. E. Edeh et al (2012)[21] – reported a laboratory evaluation of the characteristics of rice hush ash (RHA) stabilized reclaimed asphalt pavements (RAP) subjected to British Standard light, BSL (Standard Proctor) compactive effort to determine the compaction characteristics and California bearing ratio (CBR) values is carried out. Test results show that the properties of RAP improved when treated with RHA, using up to 2% cement additive. The particle size grading improved from 100% coarse aggregates for 100% RAP to 10 – 90% coarse aggregate with 10 – 90% fines for the various RAP + RHA mixtures containing up to 2% cement. The CBR values also increased from 8 and 14% for the unsoaked and soaked conditions, respectively, for 100% RAP content to 73 and 79% (soaked condition) for 89.25% RAP in the RAP/RHA mix proportions with 1.5% cement/89% RAP content in the RAP/RHA mix proportions with 2% cement content, with corresponding unsoaked CBR values of 28 and 26%, respectively. Generally, soaked samples recorded higher CBR values than unsoaked samples. The RHA stabilized RAP mix proportions with 89.25% RAP/1.5% cement content, & 89% RAP/2% cement content with CBR values of 73 and 79% (soaked for 24 hours) can be used as sub base or sub grade materials in road construction.

S.C.Sexena, et al (1984)[22] – studied the rise husk ash as filler in bituminous mixes the possibility of using rice husk ash - a waste product from rice - as a filler material in bituminous mixes. The Marshall Design criteria are used to establish its suitability. In the actual experiments various percentages of rich husk ash as a filler are used with different bitumen contents. The other standard fillers - cemented rock dust-were also used as comparisons in preparing the samples.

The optimum filler and bitumen contents satisfying the Marshall Design criteria are obtained for all three types of fillers used. The results obtained from rice husk ash are quite encouraging and the paper indicates further areas for research in this field. The results of this investigation, indicate that rice husk ash can successfully be used as a filler in bituminous mixes as the results obtained are quite comparable with those using cement or rock dust as a filler. For the particular type of grading used for this research four per cent (4%) of rice husk ash is considered as optimum with 6.5 per cent of 80/100 grade of bitumen.

4. CONCLUSIONS

After going through no. of researches. I conclude that use of RHA as mineral filler in HMA (SDBC).not only improves the quality of SDBC mix but also help in usage of waste material called RHA.

The no. of cases study supplied though out this research was sufficient to help readers to be familiars with the different technology applied of producing and incorporating fillers in SDBC that are important in construction of roads with very qualified pavements and improved longevity and pavement performance.

The study on the use of RHA as mineral filler in hot mix SDBC by replacing the conventional filler lime, after obtained optimum bitumen content of the mix has also increased stability and durability when compared with 60/70 grade of bitumen.

By using RHA as mineral filler in place of conventional filler increased the stability of roads thus the road can be withstand heavy traffic load and shows better service life . Use of good quality conventional materials in road construction is becoming increasingly expensive in India due to its high demand & scarcity in nature. The use of industrial

& agricultural wastes should be effectively in construction to address environmental & economic concern. So currently different type of mineral fillers like RHA, Fly ash, glass powder, marble dust etc are used in place of conventional mineral filler.[15]

So the use of rise husk ash in hot mix asphaltic pavement is lagging behind in both research & application fields which is quite observable in most developing countries like India. This is the primary motivation underlying selection of this hot mix asphalt by using RHA as a mineral filler as the present research area [13]

This study will have positive impact on the environment as it will reduce the volume of waste agricultural product to be disposed off by incineration and land filling. It will not only add value to agricultural waste but will develop a technology which is eco friendly. [21]

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