Application of Slate Powder Waste in the Manufacturing of Tiles and Pavers: A Review

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Abstract— The proliferation of industries has resulted in the need for an explosion of natural resources. The slate pencil industry is one of the fastest growing industries producing large quantities of slate powder. Waste disposal is a serious environmental hazard and has the potential to have a detrimental effect on plants and animals and species. The paper is about using this slate powder to make certain useful products. The aim of this project is to convert slide waste into tile and stone to increase the value of the economy through waste, while at the same time reducing the burden of pollution created by these industrial production materials.
Keywords: Slide Dish, Slate Pencil Field, Slate Waste Powder, Tiles, Pavers

I. Introduction

The slide is made from a combination of materials such as molded clay, a fixed rock that is found in a circular rock, and a type of rock, to throw mud or ashes from volcanic eruptions. This is produced by a lower geographical process. The history of India going back to 3200 BC slate is largely produced from open sculptures and separate cases from underground mines. India is a pioneer in exploration, commercial rock mining and in finding a solid foundation for the stone industry. About a million tons of slides are stolen every year in India. The slide stone processing produces about 0.3 tons of slate powder per one ton of processed salad stone. Of the 300 types of slides sold in the world market, about half are from India. Active trade and other industries are reported from Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamilnadu, Uttar Pradesh, Telangana etc. One of the largest pencil-making industries is located in the Mandsaur area of Mahya Pradesh in India. Slide trading is trading that involves the removal and processing of slide stone. Slate is used for building materials, electrical installations, roof slides, roofing, control board, blackboard, slide writing etc.

The main purpose of the study is to use slide waste in files and in the production of paver block in order to be more effective in reducing the cost of pollution and pollution.

A. *Other Utilization of Slate*

Areas where the use of slate debris needs to be evaluated as a common substitute for the following green uses:

1) Filler materials can be for roads and potholes: Inert material made of stone can be mixed with certain types of soil to prepare for storage leading to significant soil salvage. Mixing stone waste with silk and sand soil and mixing leads to better reinforcement of the foundation layer where the water bond can be led.
2) Brickmaking: Stones are used in the manufacture of bricks as a good adhesive using cement as a film. The physical characteristics of the bricks produced by this process are higher than those of ordinary bricks. Stone rubble, cement mortar, bricks can be made by using sandy loam and cement in a different way and shaping through an effective interaction process.
3) Cement Production in Portland: Stone waste can be used to add solid stone to building cement in Portland.
4) Manufacture of Thermo resins: to test the feasibility of converting stone spills into resin stones.
5) Mold formation: Stone waste is used instead of limestone to stabilize the soil.
6) Activation of activated calcium carbonate: Stone waste may be used in the production of activated calcium carbonate.
7) Building Openings: Stone waste can be used in empty blocks in building construction.
8) Use of stone as a gemstone as color:

II. Literature review

Literature reviews are considered an important step in building a research environment. It helps to build a solid foundation for development. Ten years ago, researchers reported that stone waste could be used more effectively as an alternative construction method. Some researchers suggest that slide debris can be successfully applied to half or all of the coarse and fine aggregates while others say that a portion of the cement can also be replaced with slate taka powder. The books were analyzed in journals dealing with building materials, concrete technologies and sustainable development. Some of the research activities carried out in this field are as follows:

In the year (2017) R. Mahadevi et al studied the feasibility of using marble and dust debris as a substitute for cement. The parameters in this study include the effect of marble powder and machry dust on the strength and performance of concrete. It was noted that using a different percentage of replacement does not reduce the strength in concrete performance. This paper discusses a high-level construction process in concrete technology that is being replaced by a different waste material. Other studies have been shown using slate powder and baggase found in the sugar industry.

In the year (2017) T. Subramani et al studied the use of fake snow powder to make waterproof cement. The parameter included in this study had an impact on mechanical properties and an impact on water, the art of cement through a waterproofing agent. It was found that the compressive, intense and flexible forces increased with the addition of fake snow powder. Waterproofing admixtures of water-proof concrete results in a stronger strength due to the addition of sterile ice odor without changing the air volume.

Deepankar kumar Ashish has learned that it is possible that marble debris is concrete such as the return of cement and sand compaction in the year (2017). The parameters included in this study were mechanical strength, ultrasonic velocity, and carbonation and micostructure structures. It was noted that excellent mechanical properties and durability can be achieved by using 20% of marble. Marble powder acts as a filler instead of cement.

Dinesh A et.al, (2017), reviewed soil compaction using solid waste. Soil samples were tested for Atterberg boundaries, mixing characteristics, swelling, shear strength, CBR value, engineering properties and index. It was found that solid waste could be used effectively as a substitute for hardening the soil.

In the year (2016) M. Singh et al studied the effect of marble concrete waste by replacing the cement slightly. The parameter in this study contributes to the particle size in the compressive force. It was observed that concrete structures made of dried mud were taken up to 15% (marble marble), increasing the quality, strength bond and solid reinforcement of the reinforced concrete. The sophisticated power prediction model was developed using a neural implant network (ANN) for reinforced concrete reinforcement with a dry marble slurry and shows the experimental differences between the predictable compression strength.

In the year (2016) S. Ghannam et al learned that this is possible by using granite powder and iron powder waste as a concrete sand replacement. The parameter includes compressive strength, flexibility and tensile strength by adding granite powder and iron powder. It was found that the replacement of 20% sand with iron powder and 10% granite powder led to an increase in dripping and concrete changes. This study shows that adding granite powder and iron powder as a substitute for sand will reduce the use of sand in the construction industry, thus conserving natural resources. Re-use of these recycled materials and use them in concrete will also reduce the health risk and impact on the status of waste disposal materials.

A. Other Studies have identified the Use of Industrial Waste Found in the Slide Industry.

L.B. Pahhares et al studied the resolution of wet slate suspension with citric acid per year (2016). The included parameters were different concentrations of citric acid and different percentages of solids in the liquid state. It was noted that the solution of slate powder containing citric acid reduced stability, better durability and a clean bed. A light dispersion method was used to analyze the solubility rate, aggregates and sedimentens in humans. A large amount of sludge is produced during the stone production process.

The research work was performed by J. Mehta et al year (2016) to use Quarter stone mortar as a recycling of marble waste in brick making. The parameters in this study were complex strength, tensile strength, flexical strength, porcious etc. It was found that quarrying stones could be used as a substitute for making bricks and other compositions without affecting buildings. Stud sludge can be used in the manufacture of bricks, tiles, as workers in the construction industry. Stone debris and other pollutants from mining operations can be used to stabilize the soil as seen in the literature.

A study by T. Subramani et al in investigating the possibility of marble debris being replaced by cork in the year (2015). The parameter included in this study was a compressive force, a dividing force in concrete strength. Marble powder powders can be used as cement cleaners or good adhesives while preparing concrete.

In the year (2013) X. Peng et al studied the effect of slate powder on the alkaline activity of slate aggregate. The parameter in this study included the particle size and percentage of slate powder in the composite increase. It has been found that up to 20% of the powder content in slate aggregate does not suppress alkaline reactions, but it affects the particle size and reduces the elasticity of speculation and when the content is less than 10% it has no adverse effect on sample enlargement.

In the year (2013) L. Zang et al studied the substitution of alkali found in slate powder using fly ash. The parameters in this study include the percentage of slate powder, temperature and phase. It was found that up to 15% of the addition of slate powder to fly ash high alkaline activity of slate powder is reduced. Beyond this percentage of the slide compresses the visibility of the mixture. The mortar bar test method was used to increase the use of slate powder. The combination of minerals containing active SiO_2 improves the reaction of alkali silica.

UW. Labib et al (2005) reviewed the use of slide debris as an alternative to concrete. The parameter includes the effect of particle structure, scale size, surface texture, performance and strength of concrete. It has been found that the ingenious composition of salad dressings can be used as a concrete mixer. Use of industrial waste such as slide contamination, fly ash, marble debris etc. It is concrete and forms a composite. This conserves natural resources and reduces the required space for landfill.

Gulden Cagin Ulubeyli and Repep Artir (2015), have shown that a slide site with cement or mortar is added to reinforced concrete structures and reinforced concrete structures. However, the use of compacting waste or polymer concrete has not been significantly affected by hardened concrete structures.

Kishan P. Pala and Krunal J Dhandha (2015), scholars, new materials such as filling capacity and capacity are increased with the use of 10% Slate Powder and 25% fly ash by adding cement to the material. In a solid state such as Flexural Power, Competitive Power and Split Power would be considered, Slate powder could be used up to 10% and fly 25% ash.

Ranjodh Singh et.al, (2013), has shown that well-reinforced structures were obtained in concretes with 25% slate powder which can be considered because of the correct high strength content. an attempt was made to incorporate some of the best combinations of brick dust and slate powder. Both bricks and powdered bricks are a by-product of the dumping and disintegration of garbage, creating a shortage of land and pollution. the use of these types of concrete waste products can be a major step in the development of sustainable infrastructure.

UM. SahulHameed et.al, (2012), has shown that it can be achieved to use individual slate sludge powder

(MSP) and broken garbage (CRD) within the production of self compacting concrete (SCC). This use of waste improves physical and mechanical properties. Reusing and reusing waste to produce SCC may be the most effective decision to fund the future economy. it is proposed to replace natural sand with 85% CRD (Crus Crosed Rock Dust) and 15% slate sludge powder (MSP), instead of SCC.

Omar et.al, (2012), studied complex energy and due to the fact that SiO2 active in acid waste will react with Ca (OH) 2 in concrete to form a calcium hydrate hydrate formed and to form a strong chemical structure.

Bouzianiet. al. (2011), have shown that increasing the volume of Slate powder (MP) in compacting sand concrete (SCSC) will increase each Minislump flow and the time of V-funnel flow. SCSC has very high volatility index values and very low flow index values of 250 kg / m3 MP. This volume is ideal for SCSC, as it allows the mixture to have a smooth flow throughout the flow (up to 30 rpm) while introducing sufficient viscousness at the end of the flow to allow for separation.

Ergun (2011), used slate powder to show concrete as a filter effect. The reason can be said to be that the filler is inert and that it would be assumed that ultrafine covers the concrete voids. The use of slate powder screed reduces porousness in physical concrete mixing, and has a highly binding properties formed by the hydration of calcite and C3A chemicals. In concrete containing 5-hitter taka slate powder as a partial replacement of the concrete weight with a light plasticizing admiform there was greater strength mixing than concrete control models. As a result, a mixture of cement and diatomite and slate powder individually or separately may be used to improve the applied conditions of conventional concrete mixing.

Zoran Grdić, et.al (2008), found that the addition of fly ash to the component containing hydraulic lime is very useful, bringing about a positive moral improvement of SCCFAHL (SCC by mixing concrete with hydraulic lime). Also, this mixture has less filling and water flow capacity than different mixtures. Silica fume, an additional cost, incorporates into the SCC the same performance as that of conventional concrete mixed with vibration. it is caused by a mismatch between silica fume and a super-plasticizer that requires an increase in water balance in order for concrete to work consistently.

Dr. Suji D, et. Al. found that slate powder in place of cement is replaced by various percentages (2.5%, 5%, 7.5%, 10%, 12.5%, and 15%). and presented his paper the results of research conducted to investigate the possibility of using dust and dumping slate powder in concrete. It has been found that concrete studies made of strry rock dust and slate powder increase by 12.5%. The flexible beams gradually increased to 10% with the inclusion of slate powder and strry dust and continued with the addition of similar products simultaneously with reduced strength. Therefore, it is concluded that the replacement of natural sand with stone dust, such as replacement of concrete and the return of concrete with slate powder is possible and economical compared to conventional concrete.

Bhupendra Singh Kalchuri1, et. Al. In concrete it is prepared with slate powder as a limited substitute for fine aggregate (Sand) in different proportions i.e. 10%, 20%, 30% and 40% and tested for 7days, 28days, 90days in treatment period. The strength of complex concrete increases as the percentage of slate powder concentration rises to 20% and by increasing the percentage of slate powder concentration is reduced. Experimental results obtained as here again indicate that powder slate powder can be used effectively as part of a good blend in concrete production.

Mr Aalok D. Sakalkale (2008) et. Al. This study aims to use the Waste slate powder construction industry itself as a good adhesive in concrete, replacing natural sand. Replacement is done partially and completely in the 0%, 25%, 50% and 100% sections and their effect on the concrete materials under investigation. The strength of the concrete and the flexibility of the concrete increases with the addition of slate powder screed up to 50% by weight. The different strength of cylinders cylinders is reduced by the incorporation of slate powder, from the control mix to 100% sand. Therefore, 25% sanding with WMD can also provide less tensile strength. Therefore, it was found that the optimal percentage of sand retrieval with slate powder in concrete is about 50%.

Bahar Demirel (2014) slide dust as a good material for concrete materials has been investigated. For this purpose a variety of concrete brushing was prepared by replacing fine sand with a scale of 0, 25, 50 and 100% by weight. It was found that the addition of such a WMD that would replace a positive outflow by a rate of 0.25 mm to some extent showed an effect that could increase the compressive strength. SEM research has shown that Ca (OH) 2 morphology in the four-and-WMD scales differs from each other.

Mr. Lokesh Kumar, Prof. Gautam Bhadoriya (2017) Cement is replaced by Fly Ash and fine blades are replaced with stone dust and slide dust. The test was performed by adding 25% and 35% Fly Ash to the cement and by adding slide dust and rock dust up to 40%. On the M3 high-strength concrete is obtained by adding 25% of Fly Ash and power up to M9 is obtained by adding 35% of Fly Ash.

Ramaman Kumar, Ankit Mahajan (2015): Fertilizers are replaced by slate debris at 0%, 10%, 15% and 20%. Superplasticizer AURAMIX 400 is used every 0.06.Curing for 7 , 14 and 28. days. At 15% the maximum compressive strength is 40.5, the discount strength is 6.03, the reverse power is 5.92 and the power begins to decrease by 20% (after 28 days of treatment).

Bhupendra Singh Kalchuri1, Dr. Rajeev Chandak, R.K.Yadav (2016): Partial recovery of sand slate debris at 10%, 20%, 30% and 40% in 7, 28 and 90 days of healing. Compressive force is generated. 20% of maximum compressive strength is obtained. The maximum competition strength in 7 days is 27.18, 28 days is 41.04 and in 90 days it is 54.1. The gravitational force is 3.10 and the specific gravitational force of the slide is 2,577.

Manju Pawar et al (2014) A study conducted in periodic research, The Importance of Partial Recovery of Cement with Waste Slate Powder. They found that the effect of using slate powder as a particle with mortar or concrete by reducing a portion of the cement was studied in terms of stronger, greater strength and flexibility. Existing variations in the variability of the powdered part reveal that the powder coefficient (WMP) enhances improved performance and performance. Leaving products to ruin the environment directly can create an environmental problem. As a result, the stiffness of the concrete reinforcement is enhanced by the incorporation of Powder stones up to 12.5% held by the physical bodyweight and further any WMP insertion for the stiffness decreases. Concrete strength is enhanced by the inclusion of powdered stones up to 12.5% instead of weightweight and further by the inclusion of WMP Tensile strength. Therefore, they found the right amount of MDP that can be seen and is approximately 12.5% visible in both periods of solidity.

B. V.M. Sounthararajan et al (2004) A study was conducted on the impact of Lime content on MDP Production High Power Concrete. They found that MDP up to 10% by weight of material was tested to show tangible properties. In addition, the effects of a different level of MDP on rigidity, decreased rigidity and rigidity were analyzed. It can be assumed that the positive impact has been on the relative values of the cement which is estimated to have had a significant impact on the development of signs of stiffness. A dramatic increase in pressure of 46.80 MPa in 7 days instead of 10% different MDP in visual content has been reported and also produced technically marketable goods compared to intangible.

C. Corinaldesi V et al (2010) Slate as a building material especially in palaces and monuments has been used for years. However, use is limited to stone bricks in walls or rooms or as wall cracks in walls, ceilings or floors, leaving its spill in marks or in the size industry can often be considered for use in the construction industry itself as a filler or plasticizer in mud or concrete. The result is that a large 40% of the total rock masses have already acquired a large amount of space. This magnificent era of rock formations that can be formulated with the finest pollutants these days is one of the biggest environmental problems in the world.

Sadek et al (2016) Aims to obtain a good brushing texture by adding slate powder, granite powder, and ered slate powedered of 20%, 30%, 40%, and 50% of the weight of cement at the junction concweight bodyweight is maintained continuously at 400 kg / m3. The duration of the 28-day reduction was revealed to increase by 1.7%, 3.9%, and 9.5%, with powdered stones in the range of 30%, 40%, and 50%; it was 7.8%, 23.1%, and 39.3% of the total was 50% powdered stone, powdered salad, and powdered stone in particular, indicating that performance decreased with strong heated content.

Chavhan and Bhole (2014) Produced a concrete mix by replacing the slate powder with slate powder at prices ranging between 5% and 50%, and reported that the 14-day and 28-day free slate sample values were 30,14 MPa and 28.16 MPa, respectively; the weak energy value for 28 days was 4.65 MPa. In comparison, the stiffness values of the model consisting of 50% powder powder on the same days were considered to be 33.13 MPa and 35.67 MPa, and the solid strength value was 5.72 MPa.

Soliman (2013) Produced concrete mixing by replacing cement with slate powder in quantities of 2.5%, 5%, 7.5%, 10%, 12.5%, 15%, 17.5%, 20%, and produced 115 samples _ 40 _mm slabs; saw a 24.8% increase in the 28-day strength of the average estimate of 2.5% compared to the control sample, and an 8% increase with a return rate of 7.5%. They reported that while the 28-day power was 3.8 MPa with a recovery rate of 5%, it dropped to 2 MPa with a 20% restoration rate. They reported that the reduction potential was reduced at all levels to replace that number.

Prassianakis And Prassianakis (2004) and Prassianakis et al (2000) It was noted that slate is a metamorphosed product for the incorporation of limestone subjected to heat and pressure and is chemically sensitive.

Vuk et al (2001), describes slide dust as pozzolan. He also pointed out that calcium carbonate ($CaCO_3$) in slate dust combines with trical calcium aluminate (C_3A) cement, which is present in large quantities. This reaction increases the speed of hydration and the compressive strength of the cement.

Gameiro et al (2014) studied the effects of slate composites on concrete reinforcement. They replaced granite sand, basalt and river sand at a rate of 20, 50, and 100% respectively. They found that a 20% placement on the slide reduced water intake by capillary action. The 28-day carbon depth was 8.5 mm in the reference granite sample and 7.2, 6.5, and 5.5mmin samples were replaced by 20, 50, and 100% slide debris, respectively. The pressure changes in the replacement slate samples (~ 1,3%) were virtually irreversible, and the dry shrinkages subsided within 20 days when all types of sand were replaced by slate dust.

B. In Terms of Environmental Sustainability

Uygunoglu et al (2014) analyzed the effects of composite slide pieces on concrete concrete materials. They make mixtures with a water-to-concrete ratio (w / c) of 0.31, 0.34, 0.37, and 0.40, using recycled slate aggregates. The 7-day strength of the combined mixture of 0.31 w / c was 49 MPa, compared with 44 MPa of the slate aggregate sample. Similarly, the 28-day strength of the samples produced was combined and the slate aggregates were 54 and 53.5 MPa, respectively. The compression force decreases with the increasing rate of w / c.

Talah et al (2015) Researched the effects of slide dust on high-performance concrete (HPC) materials. They tested a reference sample without slide dust and an HPC sample that replaces a 15% slate. Competitive forces at 7, 28, 90, 180, and 365 days were rated at 26, 38, 44, 46, and 48 MPa, respectively, for reference reference, and at 39, 52, 58, 62 and -65 MPa, respectively, in the test sample. He emphasized that concrete reinforcement with 15% dust could be improved as well. Replacement of well-covered areas with slide dust in concrete production is being investigated.

Hebhoub et al (2011). They adjusted the slide dust samples in the 25, 50, and 100% range, and found that converting the slate dust content did not change the amount of weight. The sample strength of the 28-day sample with a replacement rate of 25, 50, and 75% increased by 22.2, 16.84, and 16.84%, respectively (related to the dust-free index of the slate). In addition, the 90-day dividing power is growing at 13, 33, and 11% respectively. However, both the compressing power and the reduced power dissipation in the sample are 100%. They also observed that performance decreased with an increase in slate dust rate. At a 100% replacement rate, performance decreased by 80%. Hebhoub et al concludes that replacing a good joint with slide dust significantly increases the strength of the loose and compacting concrete.

Belachia and Hebhoub (2011) studied the use of slide debris in concrete construction. For this purpose, they have produced a mix of slate replacement rates of 25, 50, 75, and 100%. The highest compression strength is obtained with a replacement rate of 25%. Keeping the average at 0.45 w / c, they found that waste-free samples with a stock of 33 MPa, while the samples contained 25% waste, the compressive strength increased to 36 MPa. These researchers conclude that garbage dumps are an ideal way to use other natural collections.

Corinaldesi et al (2010) examined the essential features of slide dust in concrete production. For this purpose, they replace the well-mixed concrete with 10 and 20 salts. They conclude that the spread of dust affects the performance of concrete. Although the hydration time was not found in the samples

N.B.Eden et al (1980) conducted a study of Autoclaved aerated concrete from slide litter Part 1: Other material / quantitative relationships This paper provides structural / plural relationships through a series of concoclaved aretated slate covers a wide area. Competitive forces, modural and modulus forces, and fracture symptoms have been investigated; the latter shows that the force of the ground fracture, determined by the function of the fragmentation method, currently provides the most satisfactory method in testing the durability of these materials. The results show sufficient promise generally indicating that this investigation should be extended.

J E Oti. DJ M Kinuthia (2010) studied Concrete Engineering Buildings Made with Slate Waste. In their study reports of engineering and micostructure of concrete slides incorporated through the installation of roofing in the UK are reported. Various concrete mixes were made using different sizes of slide trash as an integrated composite. In limestone aggregate concrete was used as a control. Results have shown that limestone aggregate concrete often fails at the junction between the joints and the cement and mortar, without any cracks. In contrast, concrete slate waste aggregate shows signs of failure from both site structures and subsequent cracking and cracking of the joints. The findings show that concrete made of slate waste aggregates acquires a critical strength of 25-30 N / mm2, a separation of 2-3 N / mm2 and an elastic modulus of 25-31 kN / mm2 thus demonstrating the potential of waste disposal -slate to replace limestone composites in very low to medium engineering applications.

Ding, Y.-N et al (2010). A study of the use of slate powder waste as a compound of mineral cement Investigations for the reuse of metamorphic waste replacement cement in Portland have been conducted. Crystal and pleasant behavior of slate waste, compressive strength, capillary water absorption and dry shrinkage were studied. The results show that with a replacement rate of less than 20% (by weight), slate powder has a positive effect on mechanical properties. Competitive strength of samples with taka slate powder increased by about 21% after 28 d. Slate powder shows pozzolanic activity to some degree with a positive filtering effect. In addition, capillary water moisture and dry shrinkage are similar to mud and cement.

Muhammad Nasir Ayaz Khan et al (2018) has determined how much the independence of the concrete decreased with the rise of Lightweight Aggregate and what the effects of the force are. A laboratory test was conducted to investigate the structures of the new standard concrete and lightweight concrete and the development of hardened concrete. The five songs of the concrete mixing program were prepared and tested to be 0% Light Weight Aggregate, 10%, 20%, 30% and 40%. Performance was set for each battery separately. A combined strength test was performed at 3, 7, and 28 days to test the strength development of reinforced concrete (normal + lightweight). Three standard concrete cylinders have a combination of therapeutic, therapeutic and experimental compounds, power analyzes and complex weights. The results show that the amount of water vapor increases with the increase of Light Weight Aggregate in concrete mixes and their strength gradually decreases after using 10% LWA. It has been observed in various tests that up to 10% of the Light Weight Aggregate mixing in standard concrete, strength increases by 12.8% compared to standard concrete. It is concluded that with the addition of Light Weight Aggregate to the concrete mix, the dead load decreased by 2.5% with an increase of 10% batch each. The practice of using lightweight concrete, is increasing due to their low dead load, solid heat, ash, environment, fire retardant properties and reduced construction time.

Palhares, LB, dos Santos, CG and Hunter, TN (2016) conducted a study on the dispersion of citric acid in resolving slate powder suspension behavior ,, The behavior of wet slide suspension with citric acid investigated using weaving techniques and culture. To determine the effectiveness of an efficient distribution agent with high solids loading, a series of 12 suspensions were prepared with a citric acid content of between 0.5 and 2.5% w / v and a solid 40, 55 and 70 percent solid. %. Light-scattering methods were used. flow curves are obtained with a rheometer. The results showed that interactions between the service particles could cause flow, high concentrations of citric acid, or improve stability, with low dispersant concentrations and pH of about 6. 1.0% citric acid. These behaviors were described on the basis of carboxyl groups of citric acid that promote higher particle distribution leading to lower levels of stability, better durability and a compacted bed.

Morova, Nihat; Terzi, Serdal (2016) A laboratory study of the use of slate-based debris as a cream in hot asphalt concrete concrete has been conducted. The main objective of this experimental study was to investigate the effect of slate taka powder (SWP) as filters on hot hot asphalt concrete. In the study, the use of slides collected during the molding process of slate blocks in thermal mixtures as they are still being investigated by minerals. For this purpose, four different concrete samples of asphalt were produced using limestone (LS) in varying proportions (4%, 5%, 6%, and 7%) as mineral filler. In this case, specimens were produced and tested under the Marshall Stability (MS) Test, and the maximum amount of bitumen (OBC) the number of composite samples to be used was determined. Selecting an asphalt series having a 5% filler that provided the highest stability SWP was replaced with LS filler at a rate of 25%, 50%, 75%, and 100%. Subsequent tests for MS and Indirect Tensile Powerth (ITS) were performed comparatively on samples produced and results were evaluated. As a result, it has been found that SWP can be used as a mineral filler in bituminous mixtures.

Allam M. E. et al. (2016) determined the durability of Green Concrete Containing Granite Waste Powder.In their study the performance of the durability of raw concrete containing granite debris such as replacing cement and sand by various percentages. Physical tests including slump testing, indirect fire resistance, water installation, and detection test work were performed on concrete samples as indicators of strength. The Electron Microscope (SEM) scanner is also used to investigate concrete formation by examining the Inter-facial Transition Zone (ITZ) and to investigate voids within high-resolution concrete structures. Studies have shown that the performance of raw concrete is lower than that of controlled controls without the granite concentration of all alloys with the same w / c ratio of 0.45. Adding 5% of the granite powdered grout as a partial reconstruction of concrete shows minimal mobility in SEM images showing a denser concrete mix with a much lower number of pores and fine material with less water infiltration. A common conclusion of this study was that the incorporation of granite powder into a mixture of concrete had other advantages related to durability. In addition, adding a non-powder granite powder or as an additive to cement or sand, has shown a positive effect on the strength of concrete under high temperatures.

The Oti, JE et al (2010) study shows Applications for waste materials in the UK The ability to use slide waste generated in slate construction in the UK for various applications is reviewed and the environmental effect of slide waste is also being assessed. The findings suggest that there may be the use of slide wastes in many cases, including engineering applications. In order to reduce the environmental impact from the impact of conventional building materials, large amounts of waste in Wales especially in the UK can generally be exploited. With the associated economic benefits despite the reported travel difficulty, the use of this pollution channel for efficient and low to medium engineering applications is accessible and can increase the use of excessive regional and national waste and reduce the environmental impact of its disposal.

M.Campos F. Velasco MAMartínez JMTorralba (2003) Returns the Waste as a Raw Material for Building Tiles, This study, which includes a visual representation and inspection of storage areas, is a green test and its behavior during compilation to determine its suitability for powdered technology. The measurement of chemical analysis and X-ray disruption, as well as thermal analysis, provided details of the sinus procedure. The properties of the extracted samples were assessed by: size, change in size, volume loss, weight loss, bending point three points, water intake and clearance, and wear behavior to try to ensure their effectiveness.

III. Conclusion

The slide pencil industry produces solid waste called slate powder that is produced during quarrying, digging, cutting, cutting, making and more. Pollution produced in this sector costs about 30% of the product produced. The waste disposal features prove to be extremely harmful to the environment and cause serious, incurable diseases called silicosis that lead to fatal deaths. Most of the research work seen in the literature is related to the modification or integration of this waste into community building activities. From the research work it appears that waste can be used as a filler for a variety of products where fillers are applied to produce desirable properties. Similarly, it can be used as an ingredient in the manufacture of liquids. The field associated with the high utilization of slide waste will also be identified and may be explored. There is an urgent need for technological recycling, waste disposal for tile and side designs so that this slate litter is economically and safely consumed and minimizes the negative impact on the environment.

Acknowledgements

The Authors thankfully acknowledge to Dr. Umesh Pendharkar, Principal, Dr. Anjani Kumar Diwedi, HOD, Dr. Kanjan Upadhyay, Professor, Ujjain Engineering College, Ujjain, India for their motivations and infra structural support to carry out this research.

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