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RESEARCH ARTICLE

UTILIZATION OF FLY ASH (COAL ASH) GENERATED FROM THERMAL POWER PLANT IN ROAD/BRICKS THROUGH POWDER METALLURGY PROCESS – A WASTE MANAGEMENT STRATEGIES

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ABSTRACT

In thermal power plants coal is burn to heat the water in boiler and Making Steam to produce electricity through steam turbine. After burning coal, fly ash (coal ash) produce. It is collected in a large area and then flushed to the water resources. The water resources hardness is increase due to fly ash. In this study we utilize the fly ash as a foundation of making roads instead of mud and also make the bricks when adding concrete, clay as binder, cement and scraps of iron (called chips after machining the work piece) though powder metallurgy and compact press machine. This waste making strategy utilize the fly ash and also clean the water resources and clean the rescue land area covered by the fly ash. We also use the bigger filter paper or bag houses type vacuum cleaner to absorb the fly ash available in the air to clean the air through this fly ash contents.

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INTRODUCTION

Now a day world is facing a fly ash (coal ash) problem generated in thermal power plant. Every countries have a power plant and generated the electricity to the thermal power plants .Therefore they generate the coal ash burning the coal. They flush the fly ash to the natural resources of water like river, lakes, ocean etc. This causes many stomach disease due to high hardness of water and also a huge amount of ash are collide to air this make water pollution as well as air pollution. This fly ash polluted air makes denser the air particle and then moves toward tree, human beings through inhale the air nearby locality. Therefore nearby locality facing problem of many diseases like Asthma, lung disease, breathing problem etc. Using the bigger filter paper top side of the chimney Or Bag house type of vacuum cleaner to absorb the fly ash available in the air near the chimney of the thermal power plants. For cleaning the water, fly ash is not flush to the water resources therefore the water is not polluted. Therefore we make an arrangement (Philosophy) to utilize this making as road foundation when making road. We see that when making new road first we make foundation through mud and sand particles then bigger and small concrete and then coal tar mixes concrete.

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Instead of making this we make mud with fly ash and bigger concrete, small concrete and then coal tar mixed concrete. This increase more compressive strength. We also make the bricks through this fly ash with proportionate amount of clay, concrete and cement with small amount of scrap iron with powder form then using press machine to make the bricks utilizing to make home or road.

Theory-Use of Fly ash in two ways

To make the foundation of floor and roads through fly ash. The methodology given below: Methodology- when we prepare the foundation of floor/ roads generally mud and sand are use. In this methodology we use fly ash (coal ash) with clay as a binder to mix with sand and mud. After apply the roller (heavy loads) and leave the roads for one year and for floor 2 or three days , the roads and floor are strength are much more than mud and sands road. Then we apply the heavy concrete and then smaller concrete and then coal tar for roads. For floor, after foundation we do the flooring by reinforced concrete, the strength of floor is more.
That's utilize a lot of ash contents store in nearby site of thermal power plants (coal fired)

To make the bricks by using the powder metallurgy techniques. The methodology are given below: Methodology- When we make a bricks the following material

are required. These are fly ash (coal ash), clay as a binder, sands, concrete rust, concrete, for reinforcing the bricks iron scraps like cutting metal generated chips say scrap iron. For making all of these by powder metallurgy the ratio are Fly ash : clay binder : sand: concrete rust : concrete : scrap iron: cement as fallows 3:1:2:1:1:1:2 in ratio.

For preparing the powder form of all these contents of material the following steps are requires

Atomization: In atomization process the scraps iron are molted and then broken to small droplets by spraying it against an oncoming stream of compressed air, inert gas, or water jet. From air and water atomization we form powder of scrap iron. And other contents like fly ash, clay binder concrete rust, concrete are atomized through a crusher and mixed with iron scrap powder.

Mixing and blending: In this step, all the materials are in powders form. They are thoroughly mixed by a mixer and blended as a compact form in a binder unit. Here cement with suitable amount of water is necessary for blending and mixing operation of this material. Cement with water increase the hardness of the material.

Compacting: In compacting a bricks compacting machine are utilize, the blended mixture is compacted to bring the particles or powder into close proximity while imparting the desired part configuration and providing green strength of the part.

Sintering: In sintering, the compact obtain after compacting are heated at elevated temperature to establish a permanents strong bonds between particles and achieve the desired strength through compacts. From use of this methodology we find the good quality of compressive as well as tensile strength in a bricks. Using iron scrap make the bricks as reinforced (increasing tensile strength) while using concrete and concrete rust increase the compressive strength.

RESULTS

From using this technique we found the following benefit to small change to manufacturing the bricks.

- The changes are that we use fly ash as a main component to making bricks, clay and scrap iron as another strengthen components to make the bricks.
- The civil engineer or the material engineer check the compressive and tensile strength by universal testing machine.
- The estimation engineer calculate the cost of the bricks
- A lot of land area is rescue from the fly ash (coal ash) near by the coal fired thermal power plants
- Water hardness (pollution) reduce because the fly ash not move towards the running water like river, lakes, ocean.
- Dissolved oxygen available in the water sources through are not affected fly ash contents (particles).
- To control the air pollution through proper cleaning of fly ash available in the atmosphere.
- To make the good quality roads and floor by this methodology
- To make good quality foot path from road side, home from bricks.
- It is safe for our aquatic life though high hardness due to fly ash.

Conclusion

From here we conclude that making road/ floor foundation and bricks

- We clean / rescue the land area by fly ash
- To clean the environmental pollution like air pollution, water pollution
- To make bricks to utilize making footpath and home by waste management strategy
- To preserve many disease occur due to fly ash available in air and water.

Future scope

- To examine the tensile strength, compressive strength, hardness and other properties of the found material by powder metallurgy.
- To estimate the cost of the bricks/ roads, floor foundation, rescue land area by fly ash
- To found which disease we preserve by removing/ utilizing fly ash.

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