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# A REVIEW ON PARTIAL REPLACEMENT OF CEMENT WITH BRICK DUST

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***Abstract :*** Brick is the most important building construction material which is widely used in residential and commercial structures. In load bearing structure the most important component of masonry walls is nothing but a brick. Brick dust is a luxurious substance produced as waste in brick kilns and building sites. This waste is dumped and utilized as landfills, which is harmful to the environment. Several creative and waste materials are used in concrete by investigators all around the world to solve environmental and economic challenges. In this we studied about the brick dust, effects of brick dust on environment and use of brick dust as cement replacement material.

***IndexTerms*** **– Brick, Cement, Brick Dust, Replacement Material..**

## I. INTRODUCTION

Brick dust is a luxurious substance produced as waste in brick kilns and building sites. This waste is dumped and utilized as landfills, which is harmful to the environment. Several creative and waste materials are used in concrete by investigators all around the world to solve environmental and economic challenges [1]. These waste materials produce concrete with greater or almost identical characteristics. The brick kilns produce the majority of the brick dust wastes, with China being the top brick producer and India coming in second. According to the survey, both nations have more than 220,000 brick units, with China having 80,000 brick units alone. Pakistan provides around 1.5 percent of the country's GDP. These brick kilns produce brick waste in the form of brick dust, which not only takes up space but also poses a health and environmental risk. Because cement is the most expensive component of concrete, it should be used sparingly. Researchers have employed a variety of inventive and waste resources to overcome the expense of concrete in this way. Fly ash, silica fume, marble dust, stone dust, and a variety of other elements are among them [2-3].

## II. BRICK DUST

Brick dust is produced during the loading and unloading of bricks, as well as at building sites and brick kilns. This dust is utilized in the dumping and filling of containers [1]. Thousands of tonnes of brick trash are manufactured each year across the world, and it is disposed of in an uncontrolled manner. Since ancient periods, pozzolanic elements including such brick dust as well as other ceramic powders have been utilized in concrete [4]. Because they were uninformed of the qualities of brick dust in ancient periods, they employed it based on their experience and trials.

## III. DIFFERENT TYPES OF BRICK

### 3.1. Burnt Bricks

Due to their prevalence in contemporary buildings, burned clay bricks are often referred to as common bricks. These bricks are used for a wide range of functions in columns, walls, foundations, and more. Burnt clay bricks must be plastered or rendered with mortar when used to build walls to increase their durability, water resistance, and insulating qualities. Based on quality, these bricks are divided into four distinct class categories. Fourth-class bricks are over-burnt, shaped erratically, and frequently broken down for use as aggregate. Third-class bricks are subpar building materials that should only be used for ad hoc buildings. Second-class bricks are of average quality but may have hair-thin cracks and an uneven shape. They may have a rough surface.The top category of burnt clay bricks is first-class brick. These premium bricks feature a regular shape, a smooth surface, and greater strength and durability.

### 3.2. Sun-Dried Clay Brick

The bricks are made of loamy soil, water, and straw; they may also contain manure, clay, or sand for added strength and to keep them from breaking. The liquid needs to be poured into moulds, and the moulds need to be put somewhere dry where they are not exposed to rain. After they have dried, take the bricks out of the mould and use them for ad hoc brickwork projects.

### 3.3. Concrete Bricks

These solid concrete bricks are typically used in internal brickwork, or to construct facades and fences. Manufacturers can produce a range of sizes and forms by pouring the concrete into unique moulds. These bricks may be found by many folks at their neighborhood hardware store or masonry supply.With a normal mixture of one part cement, two parts sand, and four parts aggregates, professionals may create these concrete bricks on the Jobsite. Concrete bricks can be made on construction sites by skilled masons, saving time and money on shipping for big construction projects. They are frequently used for facades, interior brickworks, and exterior walls.

### 3.4. Engineering Bricks

Engineering bricks have excellent density and compressive strength, making them perfect for use as load-bearing materials. Engineering bricks also have a low water absorption capacity, which makes it more likely that they won't soak up a lot of moisture and prevents cracking, crumbling, or leakage. The reduced porosity of these bricks has the additional advantage of increasing their resistance to pollutants that would otherwise seep into masonry materials and corrode them from the inside. These bricks are frequently used to construct sewers, manholes, retaining walls, and basement foundations because of their exceptional strength, density, chemical resistance, and water resistance.

### 3.5. Lime Bricks

Lime bricks are a popular choice for load-bearing walls in homes and multi-story buildings because of their high compressive strength, which is achieved by combining sand, lime, and potentially a colour pigment to change the brick's final look. This kind of brick requires less mortar than other types, which expedites construction and lowers project expenses. Lime bricks are made by accelerating the chemical reaction with pressure and heat. This produces bricks with a uniform, smooth finish that are perfect for building projects. Given that sound has a difficult time travelling through the dense sand lime composition, these bricks are frequently used as acoustic insulation.

### 3.5. Fly Ash Bricks

The by-product known as fly ash, which is created by coal-fired power stations, can include poisonous elements like chromium, mercury, arsenic, and antimony. Fly ash bricks work to reuse and lessen the number of harmful metals released into the environment. They are made from fly ash, quicklime, cement, aluminium powder, gypsum, and water. In addition, because they were formed in a machine mould, they have a more consistent shape than certain bricks. Because of their superior compressive strength and reduced water absorption rate compared to burned clay bricks, these bricks are a great choice. Fly ash slabs are susceptible to cracking and breaking because the toughness of fly ash bricks declines as the brick's size increases. Fly ash bricks usually only exist in tiny sizes because of this.

## IV. Effects of Brick Dust on Environment

### 4.1. Pollution in the Air

Air pollution is defined as contamination of the interior or outdoor environment through any chemical, physical, or biological substance that alters the natural features of the atmosphere, according to the World Health Organization (WHO). Air pollution is caused by a variety of sources, including household combustion equipment, automobiles, industrial operations, and forest fires (WHO, 2013).

Particulate matter, ground-level ozone, carbon monoxide, sulphur oxides, nitrogen oxides, and leads, according to the Environmental Protection Agency (EPA), are the primary contaminants in air pollution. These contaminants may affect health and the environment. Brick kilns are the primary cause of air pollution in the South Asian area. Brick businesses are quickly expanding in Bangladesh, India, and Nepal, resulting in increased air pollution. In all of these nations, more than 108000 brick kilns are in operation, and brick kilns are the largest source of urban air pollution.

### 4.2. Impact on Health

Because individuals are exposed to so many different pollutants in varying amounts during their lifetimes, it is impossible to quantify how many people die prematurely or become sick as a result of air pollution on a global scale. However, the World Health Organization estimates that three million people die every year as a result of air pollution. Each year, 800,000 people die prematurely as a result of outdoor air pollution, which causes lung cancer, cardiovascular illness, and respiratory disease (WHO, 2000). South Asia is projected to account for almost 150,000 of these deaths. The most frequent way for contaminants to penetrate the human body and harm the respiratory system is by inhalation. Lung cancer, asthma, chronic bronchitis, and emphysema are all

caused or exacerbated by exposures to air pollution, which can overburden or break down the body's natural defensive mechanisms. Other vital systems, including the cardiovascular systems and the central nervous system, can be harmed by air pollution.

## V. USE OF BRICK DUST AS CEMENT REPLACEMENT MATERIAL

- To test the fresh and hardened qualities of cement concrete, brick dust was utilized.
- It improves the capacity to work.
- improves the qualities
- enhances the strength ,workability
- replaces the cement by fulfilling the properties and characteristics

## VI. CONCLUSION

Brick dust is produced during the loading and unloading of bricks, as well as at building sites and brick kilns. This dust is utilized in the dumping and filling of containers. Thousands of tonnes of brick trash are manufactured each year across the world, and it is disposed of in an uncontrolled manner. Since ancient periods, pozzolanic elements including such brick dust as well as other ceramic powders have been utilized in concrete. Because they were uninformed of the qualities of brick dust in ancient periods, they employed it based on their experience and trials. In this paper give overview about the brick dust, effects of brick dust on environment and use of brick dust as cement replacement material in details.

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