

A Research Submitted by:

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onConcrete Mixture Improved by some Waste Materials

**Research Title:**

**The effect of adding waste materials to the concrete mixture**

**Abstract:**

Various materials in our life are not recycled, destroyed and throw it in nature, which greatly impacts on our environment. Significant advantages of materials can be taken. These advantages can be illustrated for instances with the mixture of concrete. The results that can happen there is a positive difference in the treated concrete. In this research project, the effect of some added materials to the concrete mix will be considered.

The main objective of this research is to develop new units for construction materials of high strength, durability and a good quality. These proposed improvements are addressed by the addition of some common waste materials to a normal concrete mixture.

# The effect of adding waste materials to the concrete mixture

## 1. Introduction

In our life so many of the material are not recycled, destroyed and throw into the nature. Taking advantages of those waste materials is a point of view. This may be useful to add with the mixture of concrete. So, the results of this research show that they can be useful and cause a notable difference in the concrete properties. Therefore, it can be seen in this research project that the effect of some waste material on the concrete mix is notable.

The components of concrete for current research are follows:

- Cement.
- Aggregate.
- Sand.
- Water.
- Admixture.

The main objective of this research project is to develop a new units for construction materials with high strength, significant durability and a good quality. These are considered by adding waste materials to a normal concrete mixture.

## 2. Materials and Methods

### 2.1 Added materials:

Six common waste materials are used as additives for a normal concrete mixture in this research. These materials are: Human hair, used CDs, glass, coal Ash, peat (olive extract), and wood panelling (smooth and rough).

### 2.2 Method:

to achieve a concrete strength of about  $20 \text{ kg/cm}^2$ , a mixture of concrete contains the following materials percents of materials:

- 12% cement (2.6 kg).
- 30% sand (6.0 kg).
- 58% aggregate (12.0 kg).
- And the W/C ratio is equal to 0.5-0.7.

So, in this research project a W/C ratio equal to 0.6 has been used. By using these components, a strength of concrete equal to 242- 248  $\text{kg/cm}^2$  has been obtained.

- cubes of  $10 \times 10 \times 10 \text{ cm}$  are used.

Three problems in the preparation of concrete mixture have faced:

- The first problem is the mixture ratio of 1: 2: 3 (Cement, aggregate, sand).
- The type of sand in the laboratory was not an appropriate.
- The type of aggregate used in the first small batch size.

## 3. Results

### 3.1 Primary Results:

**Table 3.1:** The primary results of tested concrete cubes with various added waste materials.

Sample	strength concrete (kN/cm <sup>2</sup> )
Concrete Standard	84
Hay	did not give strength
peat (olive extract)	86
Ash	94
Glass + ash	102
human hair	104
Glass	124

### 3.2 Final Results:

#### 3.2.1 **Human hair is used:**

- 20 grams gave concrete strength 263 kg/cm<sup>2</sup>.
- 10 grams gave concrete strength 207 kg/cm<sup>2</sup>.
- 10 grams gave concrete strength 201 kg/cm<sup>2</sup>.

### 3.2.2 CD's is Used:

- $\xi$  CD's are broken gave concrete strength  $280 \text{ kg/cm}^2$ .
- $\circ$  CD's gave concrete strength  $290 \text{ kg/cm}^2$ .

### 3.2.3 Glass:

- $100 \text{ g}$  gave concrete strength  $280 \text{ kg/cm}^2$ .
- $200 \text{ g}$  gave concrete strength  $310 \text{ kg/cm}^2$ .

### 3.2.4 Coal Ash:

- $100 \text{ g}$  given concrete strength  $265 \text{ kg/cm}^2$ .
- $100 \text{ g}$  given concrete strength  $270 \text{ kg/cm}^2$ .

### 3.2.5 Peat (Olive Extract):

- $100 \text{ g}$  gave concrete strength  $120 \text{ kg/cm}^2$ .
- $100 \text{ g}$  gave concrete strength  $100 \text{ kg/cm}^2$ .
- $200 \text{ g}$  gave concrete strength  $95 \text{ kg/cm}^2$ .



Fig 3.1: Concrete sample containing  $100 \text{ g}$  of peat (olive extract)

### ۳.۲.۶ Wood Paneling:

#### ۳.۲.۶.۱ Smooth Type:

- ۵۰g gave concrete strength ۷۷ kg/cm<sup>۲</sup>.
- ۱۰۰g gave concrete strength ۸۰kg/cm<sup>۲</sup>.

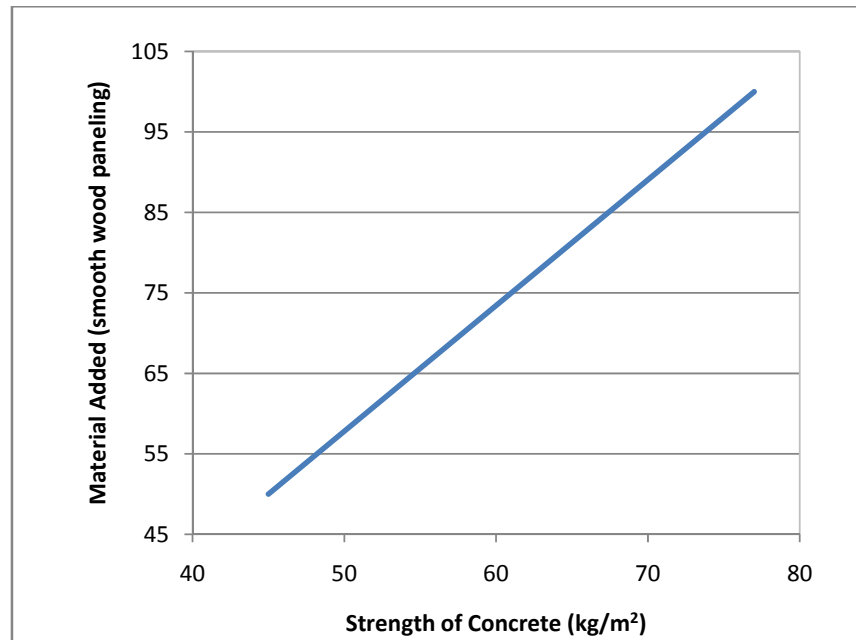
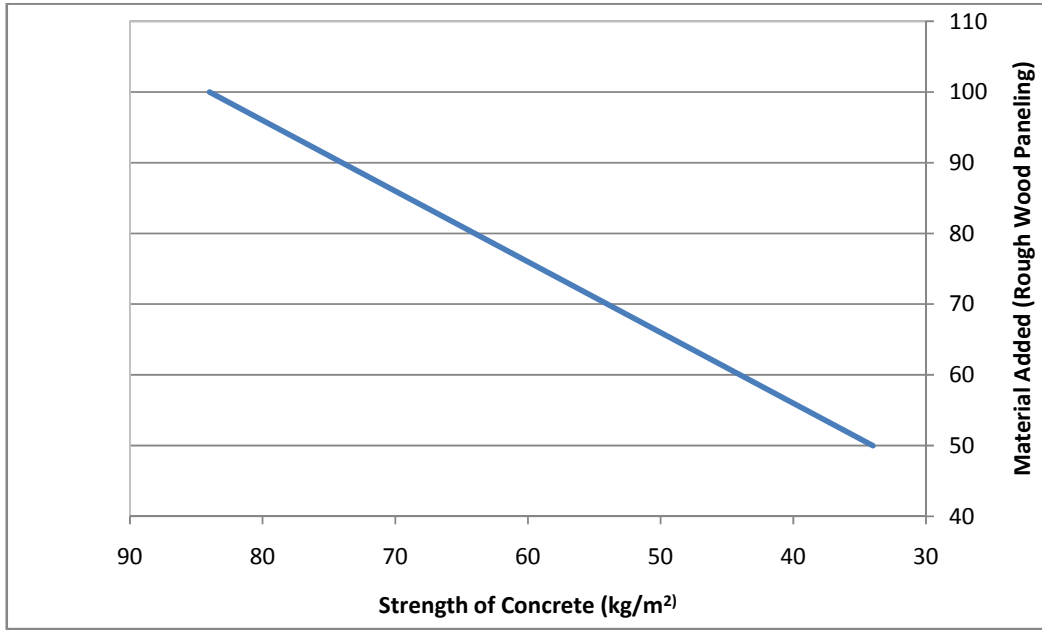


Fig ۳.۲: Relationship between Strength of concrete Kg/cm<sup>۲</sup> and added material (smooth wood paneling)

#### ۳.۲.۶.۲ Rough Type:

- ۵۰g gave concrete strength ۸۴kg/cm<sup>۲</sup>.
- ۱۰۰g gave concrete strength ۳۴kg/cm<sup>۲</sup>.



**Fig ۳.۳:** Relationship between Strength of concrete (kg/cm<sup>۲</sup>) and added material (smooth wood paneling).



**Fig ۳.۴:** Concrete sample containing ۱۰۰ grams of rough wood shavings.



**Fig ۳.۵:** Concrete sample with added straw (hay ground) ۱۰ grams per cubic.



**Fig 3.6:**Concrete samples containing 4 CD's broken.



**Fig 3.7:**Concrete samples containing 70 g of glass and 100 g ash

#### **4. Conclusions**

The addition of selected common waste materials have shown notable results. These results manifest in the acceptable compressive strength magnitude of the concrete mixture with added waste. This means that the concrete will be durable, and able to strength loading more. In the same time, using of those waste materials in a such positive way will help the local environment to be more clean and increase safety of the environment and the nature.

There are a lot of human wastedaily, which is a barrier to the natural life to be safe.forinstant,a significant size of the damaged CD's are existing in our life.So, exploited used CD's in the production the concrete mixture of this research is a point of view. The new concrete with added used CD's will give a strength with a lower cost of concrete available in the market at the same quality of normal concrete mixture. These waste materials were used in the experiments of this research gave an acceptable concrete strength, which reduces the cost of normal concrete.





**Fig 3.8:**Concrete samples containing 100 grams of powdered glass.



**Fig 3.9:**Concrete sample containing 2.6 kg cement and 6.0 kg of sand and 12.0 kg aggregate and the strength of concrete is 248kg/cm<sup>2</sup>.

## 4. References

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