Chemical Waste Ash

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Abstrak

The use of waste ash, lately a lot of research is done, in the manufacture of concrete, which aims as an added material, SCM cement replacement material, and so forth. Some ashes that have been used in research into the manufacture of concrete have been tested on chemical content, to determine whether ash from HVS paper waste can be used as a mixture for making concrete, in this experiment the parameters of the chemical content are tested according to the chemicals contained in chemical chemistry. Chemical content research using ASTM method, from the results obtained ash from paper waste ash has a high CaO chemical content above 90%, when compared with the chemical from rice husk ash where the highest chemical content of rice husk ash is SiO₂, Conclusion obtained that paper waste ash can be tested as a mixture in making concrete because it has a high CaO content, when compared with the chemical content of cement where the chemical content in cement has a higher CaO chemical content.

Key : chemical, waste ash, concrete, fly ash, husk ash

Introduction

Various kinds of ash are used as concrete additives, which aims to make concrete have a better performance, in addition to making concrete better performance, the use of ash is also one of the solutions to reduce waste, or utilize waste that is accumulating day by day.

What many researches do is rice husk waste that is made into charcoal or ash, various uses are made as additional material, or as a partial replacement of SCM from cement. As a result of combustion, coal-fired power plants or known as fly ash, rice husk ash and fly ash have high SiO₂ chemical content.

The use of waste as a substitute for coarse aggregate and husk charcoal as a substitute for sand in making lightweight concrete by [1] has been able to make lightweight concrete with compressive strength produced 22 MPa classified as structural concrete.

Literature review

The use of rice husk ash by [2] states that the chemical content contained in rice husk ash has an average chemical content above 62.5% - 97% see figure 1

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Fe ₂ O ₃	0,1 - 2,54
SiO ₂	62,5 - 97,6
CaO	0,1 - 1,31
MgO	0,01 - 1,31
Na ₂ O	0,01 - 1,58
P ₂ O ₅	0,01 - 2,69
SiO ₃	0,1 - 1,23
Carbon	2,71 - 6,42

The use of rice husk ash by 10% can increase the strength of concrete in the study [3]. Likewise with chemical content testing, conducted by [4], states that fly ash has a large SiO₂ chemical content, as shown in Figure 2.

Compound	Content, % wt
SiO ₂	59.00
Al ₂ O ₃	21.00
Fe ₂ O ₃	3.70
CaO	6.90
MgO	1.40
SO ₃	1.00
K ₂ O	0.90
LOI	4.62

The use of fly ash as an added material by [5] gives the strength of concrete and research by [6] who replaced part of the cement with fly ash concluded that by replacing part of the cement by fly ash can be done.

Metode Penelitian

In this research, making HVS-type waste paper by manually burning paper in a drum with the resulting temperature of 500 ° - 700 °, then the paper was sifted with sieve number 150, after that the ash originating from waste ash The paper was tested for chemical content, weight, and specific gravity. The testing method uses ASTM ... as

for the chemical parameters tested as follows:

1. SiO₂
2. Al₂O₃
3. Fe₂O₃
4. CaO
5. MgO
6. Na₂O
7. Mn₂O
8. K₂O
9. MnO₂
10. TiO₂
11. P₂O₅
12. SO₃

Results and Discussion

The results obtained in this test are displayed in the image below. See Figure 3.

SAMPLE CODE	ABU LIMBAH KERTAS (ALK)
PARAMETER	RESULT
SiO ₂ % db	2.63
Al ₂ O ₃ % db	0.60
Fe ₂ O ₃ % db	0.71
CaO % db	92.70
MgO % db	1.19
Na ₂ O % db	0.42
K ₂ O % db	0.07
MnO ₂ % db	0.03
TiO ₂ % db	0.40
P ₂ O ₅ % db	0.30
SO ₃ % db	0.22
Undetermined % db	0.73

Sample testing was done in accordance with below standard methods:
 Sample Preparation : ASTM D2013M - 12
 Ash Analysis : ASTM D3682 - 13

Discussion

From the results obtained that HVS paper waste ash has a higher chemical

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content of CaO where CaO is the mineral element is lime, relatively small chemical content of SiO₂ is reversed with what is obtained from the results of chemical testing of rice husk ash and fly ash where both This material has a higher chemical content of SiO₂. Meanwhile, when compared with the composition of the cement composition of chemical content has similarities. Specific gravity is 2, 9 and 64 kg / m³ fill weight. With the similarity to pozzolan cement, ash from HVS paper waste has the opportunity to do research as many researchers do using rice husk ash and fly ash.

Conclusion

From the results of testing and discussion can be concluded as follows:

1. HVS waste paper ash has a higher CaO chemical content above 90%.
2. The chemical contained in HVS paper ash waste has similarities with the chemical content of cement.
3. Waste from HVS paper ash can be continued to research as an added material or a partial replacement of cement.
4. HVS paper ash waste can be done by researching materials that require chemical content of CaO / lime.

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