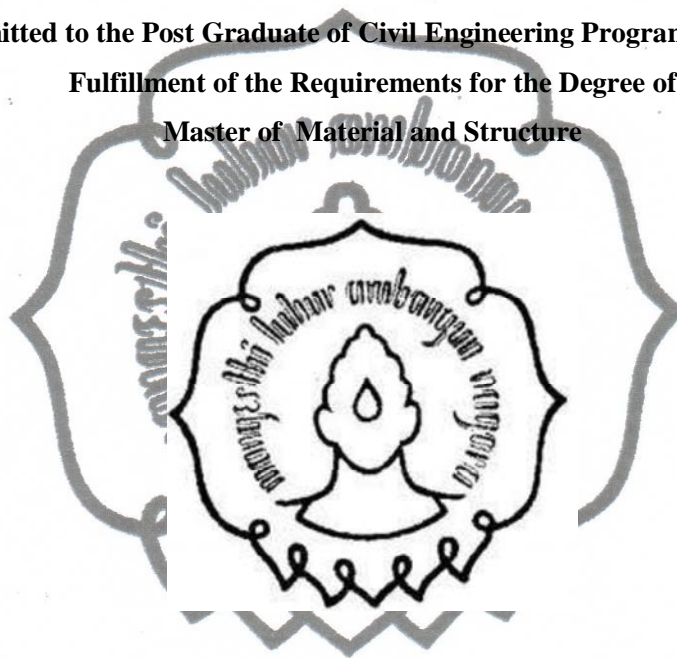


**INFLUENCE OF FLY ASH AND SILICA FUME ON FRESH, STRENGTH,
WATER ABSORPTION AND SHRINKAGE PROPERTIES OF SELF
COMPACTING CONCRETE**

THESIS

**Submitted to the Post Graduate of Civil Engineering Program in Partial
Fulfillment of the Requirements for the Degree of
Master of Material and Structure**



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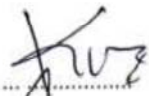

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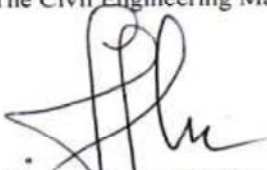
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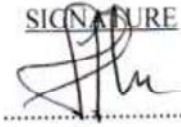
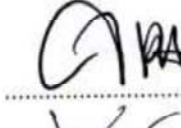
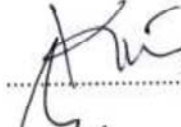
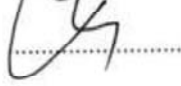
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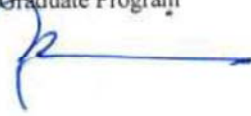
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Is really his own work. Anything related to others' work is written in quotation, the source of which is listed on the bibliography. If then, this pronouncement proves wrong, I am ready to accept any academic punishment. Including the withdrawal of this thesis and my academic degree

Surakarta, 19 June 2015

The person who makes this Pronouncement

Ali Mehoub Mohamed

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ABSTRACT

Nowdays, people need many resources of power to fullfil their need. Therefore, the use of coal is getting higher in each year. Unfortunately in line with the increase of the use of coal, it will increase the amount of fly ash. Fly ash can be used as material to get self compacting concrete. Beside fly ash, silica fume also can be used as material to get self compacting concrete. Silica fume (SF) is a byproduct of the smelting process in the silicon and ferrosilicon industry. The reduction of high-purity quartz to silicon at temperatures up to 2,000_C produces SiO₂ vapours, which oxidizes and condense in the low temperature zone to tiny particles consisting of non-crystalline silica.

This research was conducted by experimental research with the use of materials such as Portland cement, fine aggregate, water, fly ash, deasified silica fume and admixture. The research was conducted in 3 days, 7 days, and 28 days.

The result of this research are as follow: in terms of compressive strength, the replacement of SCC 35% fly ash, the fresh properties result were good compare to 15% and 25% fly ash replacement. Then, it can be concluded that fly ash replacement is increase the better workable is obtained. Moreover, in terms of water absorption, the increased of fly ash content would decrease the water absorption score, and the increase of amount of Fly Ash influence the systematic reduction in shrinkage. The case of compressive strength in Silica fume added was same with fly ash, namely the increased content of silica fume would increase the score of compressive strength. In terms of water absorption, the concrete mix without Silica Fume shows the highest water absorption than the concrete contains Silica fume while shrinkage value was decreased in line with the added of Silica Fume percentage

Keywords: Self Compacting concrete, fly ash, silica fume

ABSTRAK

Saat ini, orang perlu banyak sumber daya atau energi untuk memenuhi semua kebutuhan. Oleh karena itu, penggunaan batu bara semakin tinggi setiap tahunnya. Sayangnya sejalan dengan peningkatan penggunaan batu bara, maka akan meningkatkan jumlah fly ash. Fly ash dapat digunakan sebagai bahan untuk self compacting concrete. Selain fly ash, silika fume juga dapat digunakan sebagai bahan untuk memperoleh self compacting concrete. Silica fume (SF) adalah produk sampingan dari proses peleburan dalam silikon dan ferrosilicon industri. Pengurangan tinggi kemurnian kuarsa untuk silikon pada suhu 2.000°C menghasilkan SiO_2 uap, yang mengoksidasi dan memadatkan di zona temperature rendah untuk partikel kecil yang terdiri dari non - kristalin silika.

Penelitian ini dilakukan dengan menggunakan pendekatan penelitian eksperimental dengan menggunakan bahan-bahan seperti semen Portland, agregat halus, air, fly ash, deasified silika fume dan campuran. Penelitian ini dilakukan dalam 7 hari, dan 28 hari.

Adapun hasil dari penelitian adalah sebagai berikut: dalam hal kuat tekan, penggantian 35% dengan fly ash memberikan hasil yang lebih baik daripada penggantian 15% dan 25% fly ash. Hal ini dapat disimpulkan bahwa penambahan fly ash dapat memperbaiki kuat tekan. Selanjutnya, dalam hal penyerapan air, peningkatan fly ash akan mempengaruhi penurunan penyerapan air, dan penambahan fly ash juga berpengaruh pada penurunan skor penyusutan (shrinkage). Dalam hal kuat tekan, hal yang sama juga terjadi pada penambahan silika fume, yaitu semakin tinggi penambahan silika fume akan meningkatkan skor kuat tekan. Dalam hal penyerapan air, campuran tanpa silika fume menunjukkan skor penyerapan air paling tinggi dibanding dengan campuran ditambah silika fume, hal yang sama juga terjadi pada skor penyusutan (shrinkage) yaitu skor akan semakin menurun berbanding lurus dengan penambahan silika fume

Kata kunci: beton memadat sendiri, fly ash, silika fume

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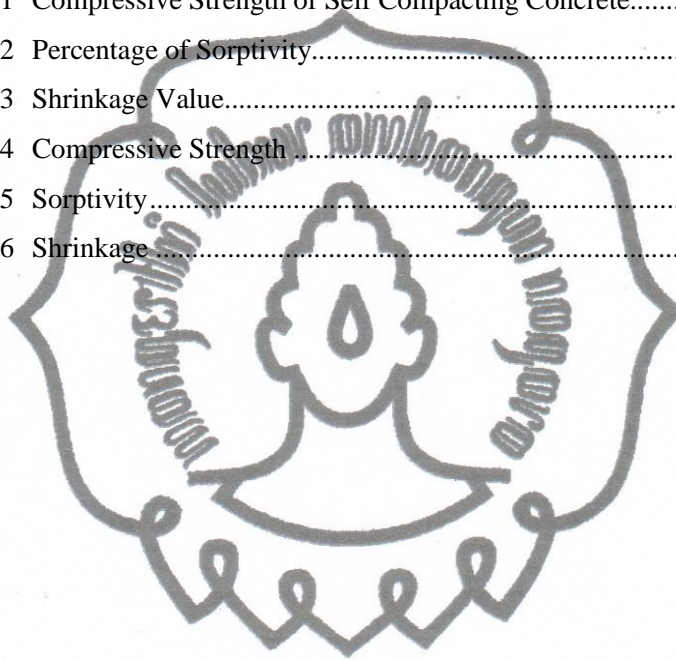
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Appendix A Properties of Self-Compact Concrete

Appendix B Picture of the Test From the Laboratorium

