DESIGN OF HIGH EARLY PERFORMANCE CONCRETE WITH THE ADDITIONAL MATERIAL OF FLY ASH AND SILICA FUME

Final Project

To fulfill part of the requirements
To reach a Bachelor Degree of Civil Engineering

Submitted by:
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CIVIL ENGINEERING PROGRAM
ENGINEERING FACULTY
MUHAMMADIYAH SURAKARTA UNIVERSITY
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Submitted and defended in Final Examination of

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Surakarta, July 2018

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PREFACE

AssaalammualaikumWr. Wb

Thank to Almighty God who has given His bless to the writer for finishing the final report in the form of laboratory experiment, entitled "Design of High Performance Concrete Early with The Additional Material and Fly Ash Silica Fume". This Final Project is prepared to meet some of the requirements of completing an undergraduate program at the Faculty of Engineering Department of Civil Engineering University of Muhammadiyah Surakarta.

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12) Other parties that can not mention one by one author.

The author realizes that this Final Report is still far from perfect, so with all the humility, criticism and constructive suggestions, the writer hopes to improve the report in the future, and hopefully this Final Report can be useful for all of us. Amin.

Wassalamu'alaikumWr Wb.

Surakarta, May 2016

Author

DESIGN OF HIGH EARLY PERFORMANCE CONCRETE WITH THE ADDITIONAL MATERIAL OF FLY ASH AND SILICA FUME

Abstrak

Dari hasil penelitian, ditemukan bahwa kekuatan beton tertinggi ditemukan pada 0% campuran abu terbang yaitu 8,12 MPa pada umur 6 jam dan 18,31 MPa pada umur 24 jam. Kekuatan beton terendah ditemukan pada fly ash 10% fly ash Campuran penggantian yaitu 6,61 MPa pada usia 6 jam dan 14,91 pada usia 24 jam. Selanjutnya, ditemukan bahwa kekuatan beton tertinggi ditemukan pada 0% campuran pengganti fly ash yaitu 24,53 MPa pada umur 3 hari dan kekuatan beton terendah ditemukan pada fly ash 10% fly ash Campuran penggantian yaitu 19,44 MPa pada usia 3 hari. Dalam penelitian ini menentukan rencana fc '60 MPa tetapi dari hasil penelitian, ditemukan fc' terjadi sama dengan 61,34 MPa, sehingga kekuatan kompresif rencana dapat tercapai.

Kata kunci: kuat tekan, fly ash, silica fume, superplasticize

Abstract

From the research, it was found that the highest strength of concrete was found in 0% fly ash replacement mixture that is 8.12 MPa at the age of 6 hours and 18.31 MPa at age of 24 hours. The lowest strength of concrete was found in fly ash 10% fly ash Replacement mixture that is 6.61 MPa at the age of 6 hours and 14.91 at age of 24 hours. Furthermore, it was found that the highest strength of concrete was found in 0% fly ash replacement mixture that is 24.53 MPa at the age of 3 days and the lowest strength of concrete was found in fly ash 10% fly ash Replacement mixture that is 19.44 MPa at the age of 3 days. In this study determine fc’ plan of 60 MPa but from result of research, found fc’ happened equal to 61.34 MPa, so compressive strength of plan can be reached.

Keywords: *compressive strength, fly ash, silica fume, superplasticizer*

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LIST OF NOTATION

SNI : Standar Nasional Indonesia

PC : Portland Cement

$f_{c'}$: the specified compressive strength of concrete (MPa)

MPa : Mega Pascal

A : Surface area of the test object (cm^2)

P_{max} : Load maximal (kN)

t : High of concrete

W : Weight of concrete (kg)

BP 1 : Concrete with superplasticizer

BP 2 : Concrete with 0 % fly ash, 5 % silica fume, superplasticizer

BP 3 : Concrete with 5 % fly ash, 5 % silica fume, superplasticizer

BP 4 : Concrete with 10 % fly ash, 5 % silica fume, superplasticizer