

**INVESTIGATION OF THE OPTIMUM AMOUNT OF SILICA  
FUME IN WORKABILITY AND COMPRESSIVE STRENGTH  
IMPROVEMENT OF SELF COMPACTING ULTRA HIGH  
PERFORMANCE CONCRETE**

**Final Project**



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2019**

# APPROVAL

## Final Project Proposal

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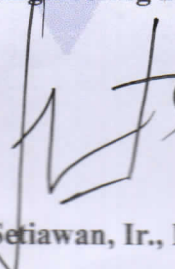
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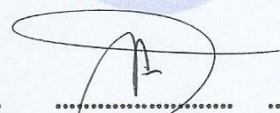
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Author realize that this final project report is far away from perfectness. Still, author hopes that this final project report might be useful for the readers and author himself. Author also hopes for all the critics and advises to develop author himself.

Author

## TABLE OF CONTENT

<b>COVER PAGE .....</b>	<b>i</b>
<b>ACKNOWLEDGEMENT.....</b>	<b>ii</b>
<b>TABLE OF CONTENT .....</b>	<b>iv</b>
<b>LIST OF TABLES .....</b>	<b>vi</b>
<b>LIST OF FIGURES.....</b>	<b>vii</b>
<b>ABSTRACT.....</b>	<b>vii</b>
<b>CHAPTER I. INTRODUCTION.....</b>	<b>1</b>
1.1. Background .....	1
1.2. Problem Statement.....	3
1.3. Problem Limitation.....	3
1.4. Objectives.....	4
1.5. Final Project Originality .....	4
<b>CHAPTER II. LITERATURE REVIEW.....</b>	<b>5</b>
2.1. Effect of Using Silica Fume on Self-Compacting Concrete .....	5
<b>CHAPTER III. BASIC THEORY .....</b>	<b>8</b>
3.1. Self-Compacting Ultra High Performance Concrete (SCUHPC) .....	8
3.1.1. History of SCC .....	8
3.1.2. Basic Properties of SCC.....	9
3.1.3. History of UHPC .....	11
3.2. Cement Replacement Material .....	12
3.2.1. Silica Fume.....	13
3.2.2. Benefits of CRM.....	14
3.3. Research Hypothesis.....	15



<b>CHAPTER IV. RESEARCH METHODOLOGY.....</b>	<b>16</b>
4.1. General.....	16
4.2. Research Methodology .....	16
4.3. Test Methodology.....	19
4.2.1. Fresh Properties .....	20
4.2.2. Hardened Properties.....	23
<b>CHAPTER V. DISCUSSION.....</b>	<b>24</b>
5.1. Introduction .....	24
5.2. Mixing Process .....	24
5.2.1. First Trial.....	24
5.2.2. Second Trial .....	26
5.2.3. Third Trial .....	27
5.2.4. Mix Design.....	29
5.3. Fresh Properties Test .....	30
5.3.1. Slump Flow Test.....	30
5.3.2. L-Box Test .....	31
5.4. Hardened Properties Test .....	33
5.4.1. Compressive Strength.....	33
5.4.2. Modulus of Elasticity .....	35
<b>CHAPTER VI. CONCLUSION AND SUGGESTION .....</b>	<b>36</b>
6.1. Conclusion.....	36
6.2. Suggestion .....	38
<b>REFERENCES .....</b>	<b>viii</b>



## **LIST OF TABLES**

Table 4.1. Test Methods for Workability of SCC .....	20
Table 5.1. Mix Design References for First Trial.....	24
Table 5.2. Mix Design for First Trial.....	25
Table 5.3. Mix Design and Result for Second Trial .....	26
Table 5.4. Mix Design and Result for Third Trial.....	28
Table 5.5. Mix Design .....	29
Table 5.6. Slump flow test result .....	31
Table 5.7. L-Box test result.....	32
Table 5.8. Compressive Strength Test Result .....	34

## LIST OF FIGURES

Figure 3.1. Typical Volume Fractions .....	10
Figure 4.1. Materials used .....	18
Figure 4.2. Mix design procedure.....	19
Figure 4.3. Slump flow test apparatus .....	21
Figure 4.4. L-box test apparatus .....	22
Figure 5.1. Coarse Aggregate Treatment .....	27
Figure 5.2. Mixing Process .....	29
Figure 5.3. Slump Flow Test Result .....	31
Figure 5.4. L-Box Test Result .....	32
Figure 5.5. Compressive Strength Test Result .....	34
Figure 5.6. Compressive Strength Test of SCUHPC.....	35
Figure 5.7. Modulus of Elasticity of SCUHPC .....	35

## ABSTRACT

### **INVESTIGATION OF THE OPTIMUM AMOUNT OF SILICA FUME IN WORKABILITY AND COMPRESSIVE STRENGTH IMPROVEMENT OF SELF-COMPACTING ULTRA HIGH-PERFORMANCE CONCRETE,**

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Self-Compacting Ultra High Performance Concrete is a developing technology in construction industry. This concrete is expected to answer the problem in concrete which are: low filling ability, low passing ability, noise pollution that caused by vibrator, low durability. In addition, this concrete has very high compressive strength which is up to 100 MPa within 28 days. However, in order to improve the workability, compressive strength and extend the hydration process, mineral admixture as cement replacement material is needed. Mineral admixtures that commonly used is Silica Fume. However, the number of optimum amounts of silica fume to replace cement is various. This study is aimed to check the optimum amount of silica fume to improve the workability and the compressive strength of concrete by adding the mixture with 0%, 5%, 10%, 15%, and 20% of silica fume. The workability test is divided into slump flow test and l-box test which has satisfying result with result from 0% to 20% consecutively are: 678 mm, 718 mm, 678 mm, 658 mm, 626 mm for slump flow test and 0.83, 0.86, 0.843, 0.84, 0.817 for block ratio in L-box test. Besides, the compressive strength is tested within 7, 14, 21, and 28 days with result from 0% to 20% consecutively are: 28.48 MPa, 32.07 MPa, 35.84 MPa, 38.67 MPa, and 32.63 MPa for age 7 days; 30.75 MPa, 34.33 MPa, 43.38 MPa, 44.52 MPa, and 35.65 MPa for age 14 days; 33.01 MPa, 36.97 MPa, 51.12 MPa, 50.74 MPa, and 35.08 MPa for age 21 days; and 34.33 MPa, 36.78 MPa, 50.98 MPa, 52.82 MPa, and 36.78 MPa for age 28 days. Also, modulus of elasticity that tested in 28 days, within the addition of 0%, 5%, 10%, 15%, and 20% of silica fume consecutively are: 21883.3, 22410.8, 22590.1, 22680.6, and 21874.7. So that, the, optimum amount of silica fume in order to improve the workability and compressive strength of Self-Compacting Ultra High-Performance Concrete is suggested between 10%-15%.

**Keywords:** Self Compacting Ultra High-Performance Concrete, Silica Fume, Workability, Compressive Strength