

Series: [Advances in Engineering Research](#)

Proceedings of the 5th International Conference on Civil Engineering and Transportation 2015

ICCET series provide a forum for accessing the most up-to-date and authoritative knowledge from both industrial and academic worlds, sharing best practice in the field of Civil Engineering and Transportation. A key aspect of this conference is the strong mixture of academia and industry. This allows for the free exchange of ideas and challenges faced by these two key stakeholders and encourage future collaboration between members of these groups.

Following the success of the previous two conferences, the 2015 5th International Conference on Civil Engineering and Transportation (ICCET 2015) will take place in Guangzhou, China. The conference program covered invited, oral, and poster presentations from scientists working in similar areas to establish platforms for collaborative research projects in this field. This conference will bring together leaders from industry and academia to exchange and share their experiences, present research results, explore collaborations and to spark new ideas, with the aim of developing new projects and exploiting new technology in this field.

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The 5th International Conference on Civil Engineering and Transportation took place in Guangzhou, China, November 28-29, 2015. The impact of construction technology and transport infrastructure development is known to be significant on the economy of any country. Therefore, the International Conference on Civil Engineering and Transportation aspired to promote construction practices and create awareness among different industry professionals. And the main aim of this conference is to bring together academics and other professionals from all over the world, for the presentation and exchange of their thoughts and experiences on concepts, trends and practices in civil engineering and advanced transportation fields. The conference is intended to offer a stimulating environment to encourage discussion and exchange of ideas leading to the advanced construction technology and transportation.

All the papers in the conference proceedings have undergone an intensive review process performed by the international technical committee, and only accepted papers are included. The total number of submitted papers is 959 and 377 are accepted. This proceeding comprised the selected papers from the subject areas of Civil Engineering and Structural Engineering, Architecture Environment and Sustainable Resources and Development, Materials and Applications, Transportation, Vehicle and Transportation Engineering, Water Supply and Drainage Engineering and Hydraulic Engineering, Architectural Design, Maintenance, Operation and Management, Construction Technology, Real Estate Development and Management.

We would like to acknowledge and give special appreciation to our keynote speakers for

their valuable contribution, our delegates for being with us and sharing their experiences, and our invitees for participating in this conference. We would also like to extend our appreciation to the steering Committee and the International Scientific Committee for the devotion of their precious time, advice and hard work to prepare for this Conference.

The Organizing Committee of ICCET 2015

title: **Development of the Conversion Value for Permeability, Absorption in Concrete**

publication: iccet-15

part of series: Advances in Engineering Research

ISBN: 978-94-6252-134-6

ISSN: 2352-5401

DOI: doi:10.2991/iccet-15.2015.43 (*how to use a DOI*)

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publication date: December 2015

keywords: Permeability, absorption, compressive strength, and the conversion value.

abstract: The development of construction technology today, allowing construction of high-rise building that has 20 floors or more simply the floor 5-7 cycles /day, so the time of completion of construction of the building quickly. The implication aspects of cost control, quality, time should be more strict and quick in decision making. One of the critical factors of success achieved work-storey building is the decision of determining material to be used. To besment whether using normal concrete (without admixture) or integral concrete waterproofing. Therefore it is necessary to use parameters or standards. Permeability, absorption and compressive strength of concrete. Standard generally used for permeability, absorption and compressive strength of concrete at the time was 28 days. Determination of the age of 28 days is often a problem that resulted in delays in the on going work. One of the parameters that is needed is the conversion value that can be used on the job besment, thus making receipt of material at an early age concrete. This study is very significant to generate the conversion value of permeability, absorption and compressive strength of normal concrete for concrete compressive strength: f_c 30 MPa, 35 MPa f_c , f_c 40 MPa, 45MPa f_c and f_c 50 MPa, so it can be used as a standard in determining the material used.

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full text: E043.pdf (1238 K)

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Development of the Conversion Value for Permeability, Absorption in Concrete

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Keywords

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Abstract

The development of construction technology today, allowing construction of high-rise building that has 20 floors or more simply the floor 5-7 cycles /day, so the time of completion of construction of the building quickly. The implication aspects of cost control, quality, time should be more strict and quick in decision making. One of the critical factors of success achieved work-storey building is the decision of determining material to be used. To besment whether using normal concrete (without admixture) or integral concrete waterproofing. Therefore it is necessary to use parameters or standards. Permeability, absorption and compressive strength of concrete. Standard generally used for permeability, absorption and compressive strength of concrete at the time was 28 days. Determination of the age of 28 days is often a problem that resulted in delays in the on going work. One of the parameters that is needed is the conversion value that can be used on the job besment, thus making receipt of material at an early age concrete. This study is very significant to generate the conversion value of

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Part of series

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[doi:10.2991/iccet-15.2015.43](https://doi.org/10.2991/iccet-15.2015.43)[How to use a DOI?](#)

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DEVELOPMENT OF THE CONVERSION VALUE FOR PERMEABILITY, ABSORPTION IN CONCRETE

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Keywords: Permeability, absorption, compressive strength, and the conversion value.

Abstract: The development of construction technology today, allowing construction of high-rise building that has 20 floors or more simply the floor 5-7 cycles /day, so the time of completion of construction of the building quickly. The implication aspects of cost control, quality, time should be more strict and quick in decision making. One of the critical factors of success achieved work-storey building is the decision of determining material to be used. To besment whether using normal concrete (without admixture) or integral concrete waterproofing. Therefore it is necessary to use parameters or standards. Permeability, absorption and compressive strength of concrete. Standard generally used for permeability, absorption and compressive strength of concrete at the time was 28 days. Determination of the age of 28 days is often a problem that resulted in delays in the on going work. One of the parameters that is needed is the conversion value that can be used on the job besment, thus making receipt of material at an early age concrete. This study is very significant to generate the conversion value of permeability, absorption and compressive strength of normal concrete for concrete compressive strength: $f'c$ 30 MPa, 35 MPa $f'c$, $f'c$ 40 MPa, 45MPa $f'c$ and $f'c$ 50 MPa, so it can be used as a standard in determining the material used.

Introduction

Construction of buildings in Indonesia, especially big cities such as Jakarta, Surabaya, Medan, and so increased as shown in figure 1 high-rise building with over 20 floors, generally have 2-3 besment used for parking floor. The work has a high building floors 5-7 cycles / day, requiring cost control, quality and a good time, in order to achieve success in its development.

The main problem of high rise building construction jobs are on the job besment the frequent occurrence of leaks in floor and wall besment. Besment impact in a number of high-rise buildings can not be used due to a leak, it is very detrimental to the owner. One effort to overcome these problems by using Integral waterproofing admixture instead waterproofing membrane type, to overcome leakage. But the reality in the implementation of work until now is still a barrier for quality acceptance testing is done through permeability, and absorption at the time the concrete was 28 days. You can imagine the time wasted if waiting 28 days, while the work of the stakeholders to start to worry if the concrete has been applied at least 4-5 floors, it was the quality of the concrete can not be accepted, it becomes a dilemma.

Faced with this problem Stakeholder building, is in need of innovation related to acceptance of quality standards testing of concrete to be used can be faster, but can be accounted for.

Research on compressive strength of concrete with concrete age has been done, while research on the relationship with the compressive strength of concrete permeability and absorption is still very limited. As for knowing a watertight concrete or can not be seen from the value of the permeability and absorption. But unfortunately the problem has not received serious attention from researchers.

This gives opportunities and motivate researchers to produce a conversion rate of permeability, absorption in normal concrete and concrete with integral waterproofing for compressive strength of $f'c$: 30 MPa, 35 MPa, 40 MPa, 45MPa and 50 MPa, so it can be used as parameters for decision-making.

Materials and Methodology

The methodology used in this study is divided into two stages:

The first stage: make specimen for the normal concrete made on one of the readymix, this is done so that this research can be applied in the field. Preparation of test complete specimen can be seen in Table 1.

Table 1 Number of samples

Compressive strength (f'_c)	Size of cylinder :			Permeability			Absorption			Total Sample
	15 cm x 30 cm			The sample size of the cube (20x20 x12) cm			cylinders:7,5 x 7,5 cm			
	I	II	III	I	II	III	I	II	III	
30	2	2	2	2	2	2	2	2	2	18
35	2	2	2	2	2	2	2	2	2	18
40	2	2	2	2	2	2	2	2	2	18
45	2	2	2	2	2	2	2	2	2	18
50	2	2	2	2	2	2	2	2	2	18

The second stage: Stage of testing

Compressive strength testing of concrete cylinders in accordance with the size of 15x30 cm SNI 03-1974-1990 standards for concrete at ages 1,3,7, and 28 days. The tools used Universal Testing Machine (UTM) 3000 KN capacity.

Permeability test according to DIN 1048 ^[1] and ASTM C642-06, this test specimen that is, given a pressure of 5 kg/cm² for 3 days, after which the specimen is cleaved and measured water into concrete

Absorption test according to the standard BS 1881 Part 122 ^[2] testing done with test specimens were dried using an oven at a temperature of 105 ± 5 ° C for 72 ± 2 hours. After the specimen is removed and left for 24 hours, then weighed. Furthermore, the specimen is immersed for 30 minutes, and weighed again.

Table 2 Mix Design of Concrete

composition	compressive strength of concrete (MPa)				
	30	35	40	45	50
Semen type I (kg)	333	366	412	459	478
Fly ash	59	65	73	81	75
Agregat Halus	610	684	634	589	641
Agregat kasar	1040	1037	1038	1012	1092
Air	180	190	189	195	143
Rasio air semen	0,46	0,44	0,39	0,36	0,3
Admixture	0,96	1,10	1,44	3,67	3,25

Results And Discussion

Based on the results obtained by conversion value for the permeability of concrete f'_c as shown in figure 1. for compressive strength of f'_c 30 MPa, 35 MPa, 40 MPa , 45 MPa and 50 MPa As for the conversion value of the absorption for concrete as shown in figure 2.

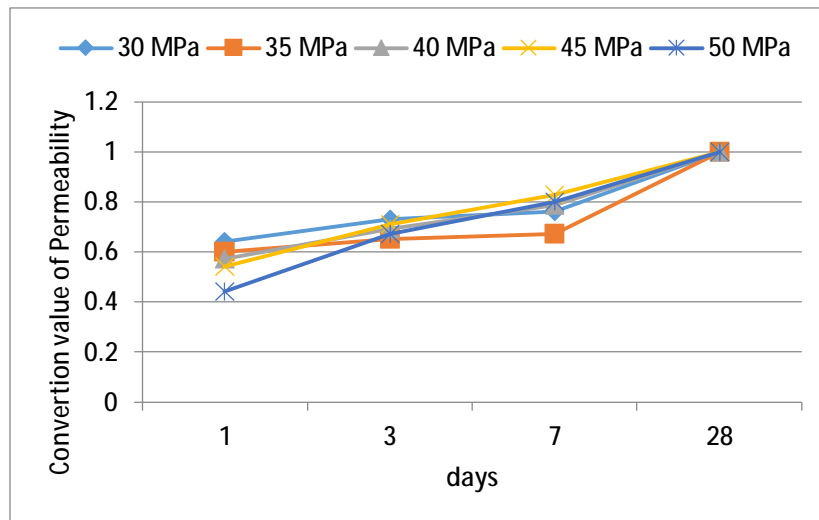


Fig. 1: Conversion value of permeability

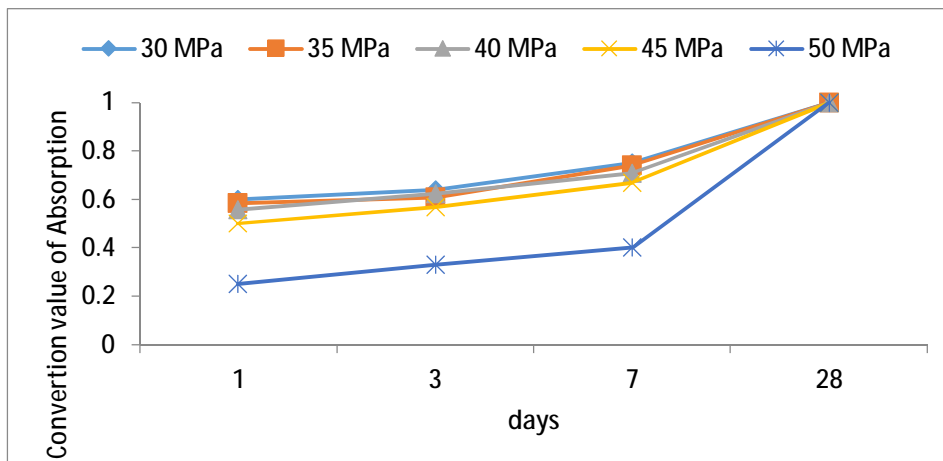


Fig. 2: Conversion value of Absorption

Based on the graph in Figure 1 and Figure 2, it can be seen the value of the conversion to permeability and absorption at the early age so that they can decide the use of concrete without having to wait for testing at 28 days.

Conclusion

Conversion value generated at the early age can be used to determine the permeability and absorption values at 28 days

References

- [1] German Standard DIN 1048-Part 5 Section 3.6 1991. Testing Concrete Water permeability.
- [2] British Standar Institution, BS 1881-122: 1983 (1983). Testing Concrete-Method for Determination of water absorption. London.
- [3] Shamsad Ahmad et al, (2008), "Correlation between Depth of water penetration, Chloride Permeanility, and Coefficient of choride Diffusion in Plain, Silica, and Fly ash cement concrete, Jurnal of testing and evaluation,

- [4] J. Wongpa et al (2010),” Compressive Strength, modulus of Elasticity, and water permeability of Inorganic Polimer Concrete”, Journal Materials and Desain Elsevier
- [5] Kartini et al,(2010), “ Absorption and permeability Performance of Selangor Rice Huk Ash Blended Grade 30 Concrete, Journal of Engineering Science and technology.