

PROCEEDINGS
**4th International Conference on Technical
and Vocational Education and Training (TVET)**

Theme:
**Technical and Vocational Education and Training
for Sustainable Societies**

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4th International Conference on Technical and Vocational Education and Training (TVET)

Theme: Technical and Vocational Education and Training for Sustainable Societies

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FOREWORD

Welcome for all respected scholars, researchers, post graduate students and especially Keynote Speakers to the 4 ICTVET. The theme of the conference focus on Technical and Vocational Education and Training for sustainable societies and consist of six subthemes. i.e Development of learning model on TVET, Workplace Learning and entrepreneurship, Innovation on applied engineering and information technology, Management and Leadership on TVET, Vocational and Technical Teachers education, and Assessment and Evaluation on TVET.

Sustainable society should be followed by the improvement of various factors that have impacts to the quality of vocational and technical education and training, particularly to overcome the competitiveness of the world business. As we have already known the rapid change of technology as well as the change of demography, having a great effects to the life of peoples in this world, The competitiveness need a collaborativeness to survive the life of millions peoples who lost their jobs. Young peoples as a productive generation have to be creative and innovative to face the competitiveness. So this proceeding contents consist of various findings of research in the field of vocational and technical education as well as applied technology and mainly based on the subthemes of the conference.

Finally, we would like to thank a million for all participants of this conference and all parties who support the success of this conference. Hopefully the seminars and scientific work of this seminar can be a reference material for basic education and elementary school teacher education in Indonesia.

Padang, July 2, 2018

Tim Editor

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IMPROVEMENT OF CONCRETE QUALITY WITH ADDITION OF SUNUA PASIR PADANG PARIAMAN WEST SUMATRA

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ABSTRACT: West Sumatra as a common area shaken earthquake, the construction of buildings both as shelters, shophouses, and other social buildings need to be built with earthquake safe concrete construction. Concrete construction is the best choice, because the material constituent relatively large, and the price is relatively cheap in West Sumatra. This study aims to increase the compressive strength of concrete with low cost. The experimental approach was chosen by experiment method that is the addition of Sunua sand material to the concrete mixture ranging from 5%, 10%, 15%, 20%, 25% and 0% for the control concrete. From the result of concrete compressive test after 28 days old with addition of Sunua sand at 5% percent = 44,20 MPa, for 10% = 48,29 MPa, for 15% = 49,62 MPa, for 20% = 44,00, for 25% = 401,37 MPa, and the control concrete is 417,46 MPa. So the highest concrete strength is obtained at 15% percentage with power 49.62MPa.

Keywords: Increased, concrete strength, Sunua sand

A. Preliminary

Development of science and technology at the end of this century so rapidly, even become the main characteristic of human life. Only qualified human beings, capable of developing, science and technology properly, continuous human resource development will be able to deliver people to cultivate and utilize existing natural resources, to meet the needs of decent and comfortable living.

The necessity of a life of one of the buildings and infrastructures which is considered vital by a country, such as housing, office building or education. Therefore needed a creativity in creating construction creations by doing construction engineering that is simple and fundamental. However, in the engineering of this construction, it should be noted also how the safety and feasibility of such engineering in the construction engineering of a building, such as concrete used for mixing the columns, sloof, beams and floors, should be carried out without leaving any security factor.

Concrete is the main material used in construction work. In order to design the strength of the concrete well, it must meet the criteria of economic aspects that is low in cost and meet the technical aspects of meeting the strength of the structure. Aggregate is a concrete-forming material having the greatest composition in a concrete mixture. The arrangement of aggregate items is one of the most important aspects of improving the quality of concrete. For fine aggregates (sand) on concrete mixtures are generally less fine

grains due to drift with water, while in order to obtain a higher compressive strength required fine particle size in order to increase the density of the concrete mixture.

Sunua Sand is a sand located in Sunua Beach, Pariaman, West Sumatra. This sand has fine grains, high specific gravity and has iron content. Therefore, researchers want to raise research with the title: "Increase the compressive strength of concrete with the addition of sunua sand"

B. Research Methodology

This research is done through experimental method approach, where there are six types of composition developed, the first type is made of concrete without added materials or called control concrete, while the other type of composition successively use added materials of sunua sand each 5%, 10%, 15%, 20% and 25%. Through this experimental method found the most appropriate trend of addition to the highest strength of the baton. The place of research is done in Civil Engineering Building Materials Laboratory of the State University of Padang.

C. Results and Discussion

Prior to the manufacture of specimens, it is necessary to test aggregate characteristics, it is intended that the aggregates used in accordance with SNI standards or requirements governing the feasibility of aggregates are used since the aggregate characteristics affect the strength and properties of the test specimen itself. In this

research the aggregates tested were split, sand, and Sunua sand. Sunua sand is taken from Sunua Padang Pariaman beach sand while other aggregates come from Lubuk Alung Padang. The following test results of aggregate characteristics:



Figure 1. Organic Sand Duku



Figure 2. Organic Sand Sunua

Table 1. Recapitulation of Duku Sand Test Result

No	PARAMETER	HASIL	SATUAN	SPESIFIKASI MAX/MIN	METODE
1	Analisa Saringan Susunan Saringan 1 1/2 @ 38.1 mm 3/4 @ 19.0 mm 3/8 @ 9.5 mm No:4 @ 4.8 mm 8 @ 2.4 mm 16 @ 1.2 mm 30 @ 0.6 mm 50 @ 0.3 mm 100 @ 0.15 mm 200 @ 0.075 mm	- - 99,82 97,27 87,72 41,77 16,65 2,46	%	-	SNI-1968-990-F
2	Zone				
3	Modulus Kehalusan	2,54		1,5 - 3,8	SII.0052
4	Kandungan Zat Organik	No.2		Warna Standar Max. No.3	SNI-03-2816-1992
5	Berat Isi Gembur	1,15	kg/l	Min. 1,2 kg/l	PB-0204-76
	Berat Isi Padat	1,55	kg/l		
6	Berat Jenis	2,98	-	Min. 2,3	SNI-1970-1990-F
7	Kadar lumpur	1,99	%	Max. 5%	SII.0052
8	Penyerapan Air Nyata	5,06	%	Max 5%	SNI-1970-1990-F
	Penyerapan air SSD	3,43			



Table 2. Recapitulation of Sunua Sand Test Result

No	PARAMETER	HASIL	SATUAN	SPESIFIKASI MAX/MIN	METODE
1	Analisa Saringan Susunan Saringan 11/2 @ 38.1 mm ¾ @ 19.0 mm 3/8 @ 9.5 mm No:4 @ 4.8 mm 8 @ 2.4 mm 16 @ 1.2 mm 30 @ 0.6 mm 50 @ 0.3 mm 100 @ 0.15 mm 200 @ 0.075 mm	- - - - 99,46 81,83 12,78	%	-	SNI-1968-990-F
2	Zone				
3	Modulus Kehalusan	1,06		1,5 - 3,8	SII.0052
4	Kandungan Zat Organik	No.1		Warna Standar Max. No.3	SNI-03-2816-1992
5	Berat Isi Gembur	1,99	kg/l	Min. 1,2 kg/l	PB-0204-76
	Berat Isi Padat	2,05	kg/l		
6	Berat Jenis	3,84	-	Min. 2,3	SNI-1970-1990-F
7	Kadar lumpur	0,43	%	Max. 5%	SII.0052
8	Penyerapan Air Nyata	1,06	%	Max 5%	SNI-1970-1990-F
	Penyerapan Air SSD	0,99			

Table 3. Recapitulation of Duku Gravel Test Result

No	PARAMETER	HASIL	SATUAN	SPESIFIKASI MAX/MIN	METODE
1	Analisa Saringan Susunan Saringan 11/2 @ 38.1 mm ¾ @ 19.0 mm 3/8 @ 9.5 mm No:4 @ 4.8 mm 8 @ 2.4 mm 16 @ 1.2 mm 30 @ 0.6 mm 50 @ 0.3 mm 100 @ 0.15 mm 200 @ 0.075 mm	- - - 100 95 79 40 8 3 -	%	-	SNI-1968-990-F
2	Modulus Kehalusan	6,99			SII.0052
	Berat Isi Gembur	1,39	kg/l		PB-0204-

3	Berat Isi Padat	1,53	kg/l	Min. 1,2 kg/l	76
4	Berat Jenis	2,303	-	Min. 2,3	SNI-1970-1990-F
5	Kadar lumpur	0,9	%	Max. 5%	SII.0052
6	Keausan	22	%	Max. 27% ¹⁾ 27-30% ²⁾ 40-50% ³⁾	PUBI 1982
7	Penyerapan Air Nyata	4,83	%	Max 5%	SNI-1970-1990-F
	Penyerapan Air SSD	1,27			

Catatan : 1) Untuk nilai K >225
2) Untuk nilai K 175 s/d 225
3) Untuk nilai K <125

C. Concrete Test Result

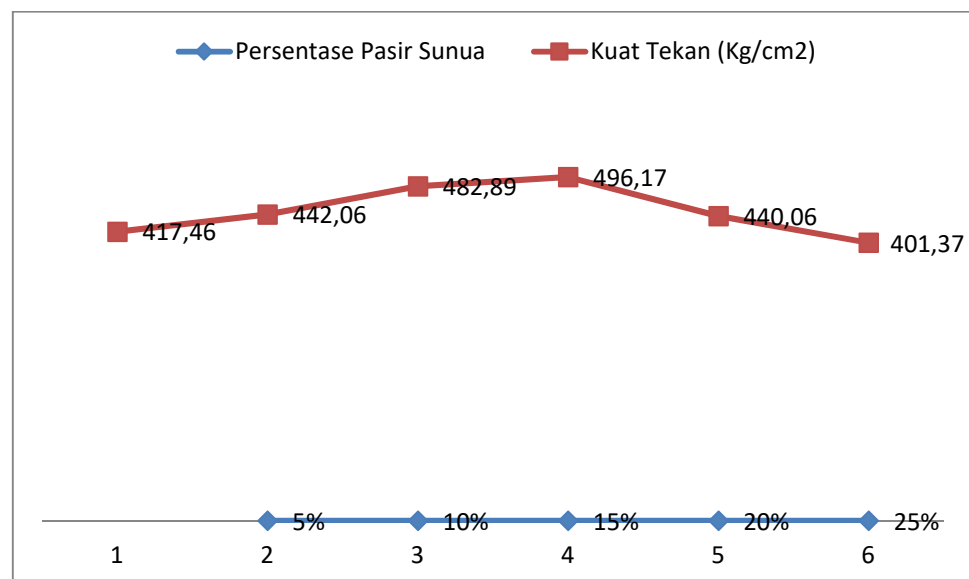
Table.4 Average Weight Concrete Cube

No	Mixed Compositions	Berat rata-rata
1	Concrete control	8237,50
2	5% Sunua Sand	8406,67
3	10% Sunua Sand	8483,54
4	15 % Sunua Sand	8502,68
5	20 % Sunua Sand	8537,75
6	25 % Sunua Sand	8594,82

Table 5. Strong Concrete Press

Sunua Sand Percentage	0%	5%	10%	15%	20%	25%
Strong Press (Kg/cm ²)	417,46	442,06	482,89	496,17	440,06	401,37

CONCRETE WITH SUNUA SAND ADDITIONAL MATERIALS



D. Discussion

Based on the results of concrete compressive strength testing with the addition of Sunua sand at age 28 days obtained variation of the results of 5 variations of different test objects, obtained a good compressive strength. The material used in this test is split, sand, and Sunua sand. Inspection of this material is done to ensure the material meets the standards in the manufacture of concrete.

From the results of examination of the material that has been done, for the level of sand slurry, Sunua sand, and gravel shows the value of 1.99%, 0.43%, and 0.9%. These results show good results because the maximum standard requirement is 5%. For the weight of loose contents, Sunua sand, and gravel obtained values of 1.15kg / l, 1.99kg / l and 1.39kg / l, while for the solid content weight of 1.55 kg / l, 2.05kg / l and 1 , 53kg / l. These results still include a minimum standard of 1.2kg / l despite the weight value of loose contents sand is only 1.15 kg / l, but the value is not too far from the standard requirements.

The results of testing the specific gravity of sand, Sunua sand and gravel are 2.98

3,84 and 2,303. These results qualify at least 2.3. For the test of real dry absorption value of 5.06%, 1.06%, 4.83%, while the absorption of SSD result is 3.43%, 0.99%, and 1.27%. The maximum standard requirement for absorption is 5%. Aggregate wear with Los Angeles's engines showed 22% yield. The results are excellent because the aggregate wear standard is <40%. Then it can be concluded that the material that has been tested can be used as a mixed material of porous concrete making as it meets the requirements of the standard specified in SNI.

After examination of the material then made the manufacture of test specimens. The compressive strength of concrete is done after 28 days of concrete. Based on concrete compressive strength concrete with Sunua sand content of 15% has the highest average compressive strength that is 496,17 Kg / cm². If the concrete control is compared with the concrete with Sunua sand content of 15%, it can be seen that there is an increase of compressive strength from 417.46 Kg / cm²

496.17 Kg / cm². But the compressive strength of all test specimens is capable of exceeding quality the plan is 25 M.Pa. Thus the addition of Sunua sand.

E. Conclusion

After doing research of concrete with the addition of Sunua sand, hence the influence of addition of Sunua sand as material added to the concrete mix with percentage 5%, 10%, 15%, 20% and 25% obtained best concrete quality found in concrete with Sunua sand content 15% of 496.17 Kg / cm². Based on these data it can be concluded that the addition of Sunua sand to the concrete mixture can improve the quality of concrete from the concrete control.

F. Suggestions

Based on the tests that have been done, the testers suggest that better concrete manufacture plus finely graded sand like Sunua sand. Smooth grains on Sunua sand can reduce pores in the concrete. Because the number of pores on the concrete can cause the low quality of concrete and also can cause concrete porous. Therefore with the addition of finely graded sand can produce a compressive strength better.

G. Bibliography

- Kemala, Muthia. (2015) "*Uji Kuat Tekan Beton Menggunakan Pasir Pantai Sunua Pariaman*". Padang: PA UNP
- Mulyono, Tri. 2003. *Teknologi Beton*. Yogyakarta: Andi.
- Nugraha, Paul dan Antoni. 2007. *Teknologi Beton*. Yogyakarta: Andi
- Rani, Iskandar G. (2009). *Teknologi Beton Teori dan Praktik*. Padang: UNP Press.
- SK SNI S-04-1989-F Tentang Spesifikasi Air Sebagai Bahan Bangunan. SNI 03-XXXX-2002. Perancangan Adukan Beton Normal.
- SNI 03-1947-1990. Tentang Kuat Tekan Beton.