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Effect Of Material Testing Added To Brick Waste Light To Power Support Land In Sukodadi District

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ABSTRACT
Wrong One problem Which Possible faced by para planner And construction implementation, especially for road pavement construction is a way of dealing with poor soil or materials so that they can be used as pavement material. The problem of the level of density and bearing capacity of the soil is wrong one thing that really needs to be considered in planning and work something construction building civil. Matter This because land works as media Which withhold burden or action from construction Which built in on it. Change Weather and temperature in the field are factors that make soil unstable . This research aims to determine the effect of adding lightweight brick waste to clay soil Subdistrict Sukodadi and knowing how to improve mark stability land clay in Subdistrict Sukodadi given addition waste brick light with presentation mix5%, 10%, And 15%. The results of the research carried out can be concluded that for the experiment the addition of local lightweight bricks from the Sukodadi sub-district, Lamongan district, mixed with several variations of 5%, 10%, 15% can increase the carrying capacity of the clay soil of Sukodadi sub-district. Of course, the 10% Light Brick mixture shows very efficient results which can be seen from each CBR test process from the 5% to 15% mixture showing a stable increase.

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INTRODUCTION

Land defined in a way general land gathering from part part Which congested which is composed of minerals and organic materials, not bonded to each other with others containing cavities. The cavities between the materials contain air And water. Land own role important as storage water as well as can suppress erosion, although the soil can also experience erosion. Soil composition different different depend on the location. (Mohammad Haris , 2019).

Wrong One problem Which Possible faced by para planner And construction implementation, especially for road pavement construction is a way of dealing with poor soil or materials so that they can be used as pavement material. In general, a construction development in Indonesia is on clay soil. Clay is generally a material poor subgrade, this is because the shear strength is very low so that making a construction on this layer of soil

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always faces problems a number of problem s like Power support low And characteristic flower shrink Which big. (Christan Prasenda, Setyanto, Iswan. 2015)

The problem of the level of density and bearing capacity of the soil is wrong one thing that really needs to be considered in planning and work something construction building civil. Matter This because land works as media Which withhold burden or action from construction Which built in on it. Change Weather and temperature in the field are factors that make the soil unstable. (Ferdi Ferdian, 2015)

This research will carry out stabilization so that the soil condition is suitable used. Mixing material chemistry like chalk is Wrong One method Which can done For increase Power support And repair characteristic physical from land soft the. Objective from study This is For compare land soft original And land soft Which Already mixed with flour rock chalk using the Direct Shear Test. The results of this research obtained a comparison of values soil shear strength in direct shear tests and unconfined compressive strength tests. (Dio and Kevin, 2018)

Basic soil is a type formed from weathering sedimentation of marine biota. If The subgrade has a low bearing capacity and low swelling high, then buildings on the land often experience damage like land in area Wonorejo East. So that before land the used as basic soil, repaired first. One of the methods used to improve is by stabilization with a mixture of waste rock limestone. Addition percentage waste rock limestone And time curing in clay soil stabilization can reduce its plasticity and properties raise parameter shear strength. (Octovianus Kambu, Gati Sri Utami. 2020).

Based on various studies that have been carried out, this research was carried out by adding light brick waste as a soil stabilizer mixture to increase the shear value or compressive strength of the CBR of building clay soil on it, with expectations clay soil can support the building strong. This research aims to determine the effect of adding lightweight brick waste to clay soil Subdistrict Sukodadi and knowing how to improve mark stability land clay in Subdistrict Sukodadi given addition waste brick light with presentation mix5%, 10%, And 15%.

METHODS

Research design is the process of data collection and data analysis study. This research includes planning and conducting research, for planning to begin with observation and evaluation of study previous. Study next with start make framework writing, seta next object test And testing Which held in Laboratory Technique University Civil Islam Lamongan.

For soil samples, the original properties of the soil do not need to be retained for the sample land disturbed. You can use pocket plastic big (pocket rubbish), bag rice, or receptacle potential other For keep And move dirt from the site research into lab. Study This done in Subdistrict Sukodadi as well as testing in Laboratory Technique Civil University Islam Lamongan Jl. Veteran No. 53 A Lamongan. In carrying out the reference testing methods used are SNI and Lamongan Islamic University Laboratory Soil Test Practical

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Guidebook (UNISLA). Testing done taking samples direct in Subdistrict Sukodadi, Lamongan.

RESULTS AND DISCUSSION

Laboratory CBR Examination (AASHTO T-193-74) (ASTND-1883-73)

Equipment

a. Machine penetration (loading machine) capacity of at least 4.45 tons (10 lbs) with a penetration speed of 1.27 mm (0.05") per minute.
b. Cylindrical metal mold with an inner diameter of 152.4 0.6509 mm (6" ± 0.0026) with tall 177.8±0.13mm (7± 0.005).print must equipped with a connecting neck of 50.8 (2.0") and a hole chip of no more than 1.59mm (1/16").
c. Separator disk of metal (spacer disk) in diameter 150.8mm (5 15/16") and 61.4 mm (2.416") thick.
d. Tool pounder in accordance with method inspection compression.
e. The expansion measuring device (swell) consists of a expansion plate with holes in it, a metal tripod control rod and a watch pointer.
f. The weight puck weighs 2.27kg (5lb) 149.2 (5 7/8") diameter with a 54.0mm (2 1/8") diameter center hole.
g. Torak penetration from metal diameter 49.5mm (1.95") wide 1935 mm².

Test Objects

a. Object test prepared according to method density check standard:
b. Take for example ± 5 kg for soil or ± 5.5 kg for added soil with aggregate
c. Mix the material with water (optimum compaction water content) or other desired water content.
d. Install the mold on the weighing base plate, insert the separating disk (spacerdisk) on top of the base plate and place the filter paper on top.
e. Condense in accordance with method B or D (compression). For object Non-random tests first check the water content before compacting, whereas for non-soaked test objects, the water content check is carried out after the test object is removed from the mold.
f. Open connection And flatten with tool aligner, patch holes Which may occur on the surface. Remove the separation disc.
g. For inspection CBR non soak. For CBR soak as follows:
h. Install puck bearer on surface test.
i. Install puck ballast (4.5) kg.
j. Soak the mold and weight in water so that the water can seep in from the top and bottom.
k. Install standard together watch gauge development.
l. Note reading First And let object test during 96 hours. Water surface ±2.5 cm above objects test.
m. Take it out print on the tub water And tilt during 15 minute.
n. Take burden from puck base.

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Implementation

a. Put it down rivet ballast in on surface test.
b. For immersion test specimens, the load is equal to that during immersion First. Place a weight plate to prevent swelling of the surface of the test specimen
c. Set the penetration piston so that the load watch shows surface load of 4.5 kg. This initial load is necessary to ensure perfect contact between the piston and the surface of the test object.
d. Apply load regularly so that the penetration speed approaches 1.27 mm/minute or (0.05") per minute. Record according to the CBR inspection table.
e. Note burden maximum when loading maximum happen before 12.5 mm penetration occurs.
f. Take it out object test And determine rate water from layer on object test 25.4 mm thick.
g. When required rate water average so take example from layer depth

Calculation

a. Swell is the ratio of the change in height during immersion to the height of the original test object, expressed as a percentage.
b. Change the loading units and kg to lb and draw a load graph against penetration. In some circumstances, the start of the load curve is concave due to surface irregularities, or other causes. In this situation, the zero point must be corrected.
c. By using load values corrected for standard load penetration (respectively 70.31 kg/cm 2 (1000 psi) and 105.47 kg/cm² (1500 psi) multiplied by 100, the CBR price takes a penetration price of 2.54 mm (0.1"). Generally, the CBR price is taken at a penetration of 0.1". If the value obtained at penetration of 0.2 turns out to be greater, then the experiment must be repeated. And if this repeat experiment still produces a CBR value of 1.2 0.1", then the CBR value is taken at a penetration of 0.2". If the maximum load is reached at penetration before 0.2", then the CBR value is taken from the maximum load with the appropriate standard load .

   Mark CBR on each object test countable :

$$CBR_{0,1"} = \frac{BEBAN\ BENDA\ UJI\ PISTON\ MENEMBUS\ 0{,}1"}{3 \times 1000} \times 100\%$$

$$CBR_{0,2"} = \frac{BEBAN\ BENDA\ UJI\ PISTON\ MENEMBUS\ 0{,}2"}{3 \times 1500} \times 100\%$$

If the standard unit load price at a penetration of 0.1° = 1000 psi, then the standard unit load price at a penetration of 0.3", 0.4", 0.5" is respectively 1900, 2300, and 2600 psi. Load (load) is obtained from the results of the penetration dial reading which is then changed to the proving ring calibration graph.

$$\sigma = \frac{M \times LRC}{A}$$

A = area Pinston = 3 sq inches
m = dial reading

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LRC = factor calibration = 24 lbs

Cbr Chart :

The relationship between loading and penetration. Location correction zero point if the beginning of the curve is concave.

Connection heavy fill dry (γ d) with water content (w).

The relationship between dry unit weight (γ d) and CBR value was compared with 90% yd max and optimum moisture content (OMC). From this graph, the design CBR for the soil sample can be determined

Figure 4. 1 Graph of Soil CBR Calculation for 3 Trials

Information :

Yellow: 1 inch drop

Blue : Decline 2 Inches

From the graph above, it can be seen that the CBR calculation data is the largest is when hit 56 times, namely at a decrease of 1 inch of 2.67% and at a decrease of 2 inches it is 2.97% and the average CBR is obtained for each blow.

Table 4. 1 Average CBR value data for 3 trials

Amount Blow	Mark CBR is flat - flat (%)
10 Blow	2.67
25 Blow	2.49
56 Blow	2.82

Inspection Light Brick Mixed Soil Cbr 5 % 10 Strikes

Table 4. 2 10 Stroke CBR Check

Time (Minute)	Decline (inches)	Reading Watch
0	0	0
¼	0.0125	0.5

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Time (Minute)	Decline (inches)	Reading Watch
½	0.025	1
1	0.05	2
1½	0.075	2
2	0.10	3.6
3	0.15	4.5
4	0.20	5
6	0.30	6
8	0.40	7.3
10	0.50	8

Table 4. 3 Weight 10 Strokes

Tool	Unit	After
Heavy Soil+mold	grams	9135
Heavy mold	grams	4110

Table 4. 4 Water Content 10 Strokes

WATER CONTENT	A	Q	B
Wet soil +cup (gr)	87.00	93.00	65.00
soil + cup (gr)	67.00	72.00	51.00
Cup weight (g)	9.00	9.00	9.00
Water weight (gr)	20.00	21.00	14.00
Soil weight dry (gr)	58.00	63.00	42.00
Water content (%)	34.48	33.33	33.33
Average		33.72 %	

25 BLOW

Table 4. 5 25 Stroke CBR Check

Time (Minute)	Decline (inches)	Reading Watch
0	0	0
¼	0.0125	0
½	0.025	1
1	0.05	2
1½	0.075	2,4
2	0.10	3
3	0.15	4
4	0.20	5.3
6	0.30	6
8	0.40	7.5
10	0.50	8

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Table 4. 6 Weight 25 Strokes

Tool	Unit	After
Heavy Soil+mold	grams	9445
Heavy mold	grams	4110

Table 4. 7 Water Content 25 Strokes

WATER CONTENT	A	Q	B
soil +cup (gr)	71.00	81.00	84.00
soil + cup (gr)	56.00	67.00	66.00
Cup weight (g)	9.00	9.00	9.00
Water weight (gr)	15.00	20.00	18.00
Soil weight dry (gr)	47.00	58.00	57.00
Water content (%)	31.91	34.48	31.58
Average		32.66 %	

56 BLOW

Table 4. 8 CBR Check 56 Beats

Time (Minute)	Decline (inches)	Reading Watch
0	0	0
¼	0.0125	1
½	0.025	1.50
1	0.05	2
1½	0.075	3
2	0.10	3.6
3	0.15	4
4	0.20	4.7
6	0.30	6
8	0.40	7.5
10	0.50	8.7

Table 4. 9 Weight 56 Strokes

Tool	Unit	After
Heavy Soil+mold	grams	9501
Heavy mold	grams	4110

Table 4. 10 Water Content 56 Strokes

WATER CONTENT	A	Q	B
soil +cup (gr)	89.00	86.00	87.00
soil + cup (gr)	56.00	67.00	66.00
Cup weight (g)	9.00	9.00	9.00
Water weight (gr)	33.00	19.00	21.00

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WATER CONTENT	A	Q	B
Soil weight dry (gr)	47.00	58.00	57.00
Water content (%)	70.21	32.76	36.84
Average		46.60 %	

CONCLUSIONS

From the results of research conducted at the Lamongan Islamic University Laboratory, CBR test results were obtained with variations in the mixture of 5%, 10%, 15% Light Brick mixed with clay in the Sukodadi District area with the following mixture results: (1) Light Brick Mix 5 % obtained an average CBR value : 3% , (2) 10% Light Brick Mix obtained an average CBR value : 3.39% , (3) 15% Light Brick Mix obtained an average CBR value: 2.80% . The results of the research carried out can be concluded that for the experiment the addition of local lightweight bricks from the Sukodadi sub-district, Lamongan district, mixed with several variations of 5%, 10%, 15% can increase the carrying capacity of the clay soil of Sukodadi sub-district. Of course, the 10% Light Brick mixture shows very efficient results which can be seen from each CBR test process from the 5% to 15% mixture showing a stable increase.

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