The Effect of Stirring Time and Concrete Compaction on K-200 Concrete Press Strength

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ABSTRACT. Concrete is a component that has an important function for buildings, both in the form of buildings, housing, highways, and other public facilities. The use of concrete which is getting longer and higher also must maintain the quality of the concrete. One of the problems in concrete is the problem of compaction, the existence of cavities in concrete is a problem that if left unchecked will be fatal, concrete that has an automatic cavity will also reduce the value of concrete compressive strength, concrete compaction usually uses a vibrator or vibrator, but in reality the use the vibrator is used in a random way and does not have a fixed time rule, so the concrete is not evenly packed. This study discusses the compressive strength of concrete are produced with a mixture of the same sample but with different rules vibration time sehingga find the time to achieve the maximum compressive strength of concrete. For the average value of the highest compressive strength produced by concrete with the duration of Concrete Mix At 30 minutes and vibrator For 5 minutes with strong average value press concrete reaching 202.67 kg / cm². While the value of the lowest compressive strength is produced by concrete Duration of Concrete Mix At 30 minutes and vibrator For 10 Minutes above can be seen strong average value press concrete reaching 158.22 kg / cm²

1. Preliminary

"Concrete is a component that has an important function for a building, both in the form of buildings, housing, highways, and other public facilities. The use of concrete which is getting longer and higher also must maintain the quality of the concrete. " [1]

"One of the problems in concrete is the problem of concrete compaction which if not maximal will have a quite significant impact on the quality of concrete, the presence of cavities in concrete is a problem which will be fatal, concrete that has automatic cavities will also reduce the value of concrete compressive strength, Compaction of concrete usually uses a vibrator or vibrator, but in reality the field of use the vibrator is used in a random way and does not have a fixed time rule, so that the concrete is not dense evenly. " [2]" This study will discuss the value of compressive strength of concrete produced with a mixture of the same sample but with different vibrating time rules so that later find time to achieve the maximum value of concrete compressive strength " [3]

"Concrete is a ingredients construction very important and most dominant used on structure the building. Concrete very indemand because ingredients this is a ingredients construction that has many advantages between other, easy done with way mix cement, aggregate, water and ingredients other additions if needed with comparison certain. " [4]
1.1. Formulation of the problem
What is the value of concrete compressive strength with jobmix K-200 with differences in the duration of vibration of each minute, 5 minutes and 10 minutes and the duration of stirring concrete for 20 minutes, 25 minutes, 30 minutes?

1.2. Research purposes
To determine the value of concrete compressive strength with jobmix K-200 with differences in the duration of vibration each 1 minute, 5 minutes and 10 minutes and the duration of stirring concrete for 20 minutes, 25 minutes, 30 minutes

2. Used materials and methods used
"This study is an experimental research, which is doing different techniques and types of treatment in each group of research variables. "The following methods are presented in the flowchart below " [5]

2.1. Aggregate smooth
"Fine aggregates for concrete can be natural sand as a result of natural disintegration of rocks or in the form of artificial sand produced by stone breaking tools". [6][7]" Fine aggregate is one of the constituents of concrete in the form of river sand or sand from volcanic eruptions, fine aggregates serve as filler cavities in concrete, fine aggregates have an important role in maintaining the quality of the planned concrete, so that the fineness of the aggregate is also planned " [8] [9]
" Sand is a natural granular material that has not consolidated. Sand composed from grain - grain size from 1/16 - 2 mm. Granules sand can in the form of a single mineral, fragment rock or biogenic. Sand formed because the process weathering physical and chemistry on rock. Weathering process this usually learned in a manner separate, but on reality both of these processes usually walk together because both tend each other support in process "[10][11]

2.2. Aggregate rude
"Coarse aggregates here are used as constituents of concrete and have an important role, generally coarse aggregates are hard rock that is split and has sharp and rough sides so that when mixed with cement and sand it can bind perfectly, to find out the coarse aggregates used meet the requirements or have not been able to use abrasion testing. For coarse aggregates used in this study were restrained coarse aggregate on sieves 19.1 mm, 12.7 mm and9.52 mm have weight type 1850 kg / m3 " "Stone times are also materials that are resistant to environmental conditions such as rain and heat"[12][13]

2.3. Cement
Very cement important for ingredients adhesive concrete, cement used as for cement paste as teaser all aggregate or all element maker concrete. Cement used on research this time is portland cement type gresik with 40 kg of packaging on the market [14]" Cement works for filler cavity between granules aggregate so that happen something a compact mass or solid. Content the biggest in cement is womb CaO who owns function in the process of gluing, while SiO2 works as ingredients filler (filler), Al2O3 has function in speed up the hardening process. Whereas Fe2O3 has temperature a low melting caused it. As ingredients burn in the combustion process clinker. " [15]" Cement isa compound or substance binder hydraulic comprising from CSH compound (calcium silicate hydrate) which when react with water will could binding ingredients solid others forming one unity is compact, solidand hard, reaction formation of CSH.2 " [16]
Variation mixture concrete

Table 1 Variation long time stirring and forgiveness on k-200 beron

| SETTING         | TIME 20 MINUTES | TIME 25 MINUTES | TIME 30 MINUTES |
|-----------------|-----------------|-----------------|-----------------|
| COMBINATION     | 1 MINUTE        | 5 SAMPLE        | 5 SAMPLE        | 5 SAMPLE        |
| COMBINATION     | 5 MINUTES       | 5 SAMPLE        | 5 SAMPLE        | 5 SAMPLE        |
| COMBINATION     | 10 MINUTES      | 5 SAMPLE        | 5 SAMPLE        | 5 SAMPLE        |

3. Design Research

The process of making concrete to concrete testing

- the first process is taking sand (fine aggregate) using a sieve that is 0.40 mm in diameter and held on a sieve with a diameter of 0.39
- Sand to be heated by means in the oven to take ingredients according to dry weight
- Prepare a split stone or coral that has been prepared
- Preparing portland type i cement
- Prepare water for the process of mixing ingredients
- The mixing process uses electric stirrer media
- Put water and cement into the stirring machine.
- " Turn the stirring machine for 10 minutes so that the ingredients can be mixed perfectly.
- Put split stone or coral and ceramic waste on the stirring machine gradually gradually.
- After all the ingredients have been mixed with a mixture of water, ceramic waste, split stone and cement at 15 minutes round the mixer
- The next step is to gradually enter the sand into the concrete mixture.
- After all the ingredients are mixed evenly, the concrete mixture is then removed from the mixer to be tested for a slump to measure the water content contained in the concrete mixture
- If the water content has been felt to meet the slmp test requirements, enter the concrete mix design mixture into the cube mold with a side size of 15 cm, and compact it using a steel piercing tool and in inserting the fresh concrete mixture into the mold is required to be accompanied by vibrations or molds to solidify and reduce cavities in concrete structures.
- Let the concrete dry until it's perfect, between 5-7 days.
- After the concrete is dry, unload the concrete mold and do the next process, which is the concrete curing process or soaking the concrete into the pool for 28 days analysis time.
- Lift the concrete from the curing pond and wind the concrete for 1 day for the drying process.
- The last process is the concrete compressive strength test "

4. Results research

" Value strong press concrete obtained through system way testing standard, use machine test with way give away load press graded on object test cylinder concrete (diameter 150 mm, height 300 mm) up destroyed. For standard testing strong press used SNI 03- 6805 - 2002 and ASTM C 39 / C 39M-04A.

\[ K = \frac{P}{A} \]
Where

\( K \) = Strong press concrete (kg / cm²)

\( P \) = Compressive force axial, stated in newton (N)

\( A \) = Area cross section transverse object test, stated in cm² ) "[4]

**Table 2 average values strong to press the entire concrete**

| EXAMINATION OF CONCRETE | 20 MINUTE | 25 MINUTE | 30 MINUTE |
|-------------------------|-----------|-----------|-----------|
| 1 MINUTE                | 165.33    | 170.67    | 168.89    |
| 5 MINUTE                | 175.11    | 191.11    | 202.67    |
| 10 MINUTE               | 166.22    | 175.11    | 158.22    |

- From the concrete table The Length of Concrete Mix At 20 minutes and vibrator For 1 minute on can be seen strong average value press concrete reach 165.33 kg / cm².
- From the Long Mix Concrete table At 25 minutes and vibrator For 1 minute on can be seen strong average value press concrete reach 170.67 kg / cm².
- From the table Duration of Concrete Mix At 30 minutes and vibrator For 1 minute over can be seen strong average value press concrete reach 168.89 kg / cm².
- From the table Duration of Concrete Mix At 20 minutes and vibrator For 5 Minutes above can be seen strong average value press concrete reach 175.11 kg / cm².
- From the table Duration of Concrete Mix At 25 minutes and vibrator For 5 Minutes above can be seen strong average value press concrete reach 191.11 kg / cm².
- From the table Duration of Concrete Mix At 30 minutes and vibrator For 5 Minutes above can be seen strong average value press concrete reach 202.67 kg / cm².
- From the table Duration of Concrete Mix At 20 minutes and vibrator For 10 minutes on can be seen strong average value press concrete reach 166.22 kg / cm².
- From the table Duration of Concrete Mix At 20 minutes and vibrator For 10 Minutes above can be seen strong average value press concrete reach 175.11 kg / cm².
- From the table Duration of Concrete Mix At 30 minutes and vibrator For 10 Minutes above can be seen strong average value press concrete reach 158.22 kg / cm².
4. Conclusions and recommendations

From the results testing and discussion, the following conclusions can be drawn:

- From the Long Mix Concrete table at 20 minutes and vibrator for 1 minute on, the strong average value of press concrete is 165.33 kg/cm².
- From the Long Mix Concrete table at 25 minutes and vibrator for 1 minute on, the strong average value of press concrete is 170.67 kg/cm².
- From the table of Duration of Concrete Mix at 20 minutes and vibrator for 5 minutes, the strong average value of press concrete is 175.11 kg/cm².
- From the table of Duration of Concrete Mix at 25 minutes and vibrator for 5 minutes, the strong average value of press concrete is 191.11 kg/cm².
- From the table of Duration of Concrete Mix at 30 minutes and vibrator for 5 minutes, the strong average value of press concrete is 202.67 kg/cm².
- From the table of Duration of Concrete Mix at 20 minutes and vibrator for 10 minutes, the strong average value of press concrete is 166.22 kg/cm².
- From the table of Duration of Concrete Mix at 20 minutes and vibrator for 10 minutes, the strong average value of press concrete is 175.11 kg/cm².
- From the table of Duration of Concrete Mix at 30 minutes and vibrator for 10 minutes, the strong average value of press concrete is 158.22 kg/cm².

For the average value of the highest compressive strength produced by concrete with the duration of Concrete Mix at 30 minutes and vibrator for 5 minutes, the strong average value of press concrete is 202.67 kg/cm². While the value of the lowest compressive strength is produced by concrete Duration of Concrete Mix at 30 minutes and vibrator for 10 minutes, the strong average value of press concrete is 158.22 kg/cm².

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