Model rheologi susut dan rangkak beton berkinerja tinggi di daerah tropis lembab = Shrinkage and creep rheological models of high performance concrete in humid tropical weather / Chatarina Niken Dwi Wahyuni Setya Budi Utami

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Abstrak

[ABSTRAK
Penelitian susut dan rangkak di daerah tropis lembab ini dilakukan pada beton berkinerja tinggi fcâ€™ 60 MPa dengan campuran tanpa abu terbang (TAT) dan dengan abu terbang (DAT). Spesimen susut berukuran 150Ñ…150Ñ…600 mm3 (3 buah) dan spesimen rangkak 200Ñ…600Ñ…2700 mm3 (1 buah). Pemberian beban dilakukan dengan cara pratekan sebesar 0.3 fcâ€™ pada umur 15 hari, tulangan sebatas emberian beban tersebut. Ruang dikondisikan pada temperature 28Â±3OC dan kelembaban 72Â±5%.
Model dibuat berdasar pengamatan 800 hari dan 1000 hari. Data diolah dengan metode outlying ASTM E178-02 untuk nilai ekstrim dengan tingkat signifikansi 5%.
Tujuan penelitian ini adalah menghasilkan model rheologi susut dan rangkak beton berkinerja tinggi di daerah tropis lembab.
Model rheologi susut sampai jangka waktu 1000 hari adalah (H|N)-(H|N), sedangkan untuk rangkak (H|N)-(StV|N). Faktor koreksi susut untuk rasio air terhadap semen (w/cm) 0.26, 0.30, 0.34, dan 0.38 dalam jangka pendek (7-15 hari) berturut-turut adalah 1, 1.1, 2.1 dan 2.3, serta untuk jangka panjang 1, 1.13, 1.54 dan 1.65. Faktor koreksi jumlah semen sama dengan faktor koreksi ACI 209R Tropis lembab menyebabkan suhu maximum 24 jam pertama untuk skala penuh dapat
mencapai 2 kali suhu maximum di daerah non tropis lembab. Pencapaian suhu maximum tersebut setengah waktu pencapaian suhu maximum di daerah non tropis.
Laju regangan susut di daerah tropis lembab pada jangka pendek TAT adalah 1.1 dan jangka panjang 4.1 kali laju regangan ACI 209R dan bila dengan abu terbang 1.6 dan 2.4. Laju rangkak kedua campuran terhadap ACI adalah 0.8 untuk jangka pendek dan 1.8 untuk jangka panjang. Regangan susut jangka panjang terhadap ACI 209 untuk
TAT 1.7 dan DAT 1.4; sedang rangkak 1.3 dan 1.;
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ABSTRACT
The research of shrinkage and creep in humid tropical weather area was done in highperformance concrete HPC fc of 6The research of shrinkage and creep in humid tropical weather area was done in high performance concrete (HPC) fcâ€™ of 60 MPa mixed with composition without fly ash called TAT and within fly ash called DAT. Three shrinkage specimens are 150Ñ…150Ñ…600 mm3 and one creep specimen is 200Ñ…600Ñ…2700 mm3. Loading was applied by prestressing of 0.3 fcâ€™in 15th day, the reinforcement was limited by that prestressing. Room was set in 28 Â± 3oC temperature and 72 Â± 5% humidity. Rheological models were created based on 800 days and 1000 days
observation. Datas were processed by using ASTM E178-02 outlying methode for extreme value with 5% significant level.

The objective of this research is to create rheological models of shrinkage and creep of high performance concrete in humid tropical weather.
Shrinkage rheological model until the age of 1000 days is (H|N)-(H|N), while for creep is (H|N)- (StV|N). Shrinkage correction factors for water ratio to cement (w/cm) of 0.26, 0.30, 0.34, and 0.38 (7-15 days) are 1, 1.1, 2.1 and 2.3 respectively, and for long term are 1, 1.13, 1.54 dan 1.65. Correction factors of cement amount was similar with correction factor of ACI 209R.
Humid tropical area caused maximum temperature in first 24 hours could reach 2 times of maximum temperature in non humid tropical area (full scale). The maximum temperature achievement was much faster, that was a half of maximum temperature achievement in non humid tropical area. Reffered to ACI 209 R, the rate of shrinkage
in humid tropical area in short term is 1.1 and for long term is 4.1 times rate ACI 209R for TAT, 1.6 and 2.4 for DAT. Creep rate of the both mixture was compared with ACI 209R: 0.8 for short term and 1.8 for long term. Long term shrinkage strain of TAT and DAT was 1.7 and 1.4 times ACI 209R, while for creep was 1.3 and 1.0 MPa mixed with composition without fly ashcalled TAT and within fly ash called DAT Three shrinkage specimens are150 150 600 mm3 and one creep specimen is 200 600 2700 mm3 Loading wasapplied by prestressing of 0 3 fc in 15th day the reinforcement was limited by thatprestressing Room was set in 28 3oC temperature and 72 5 humidity Rheological models were created based on 800 days and 1000 daysobservation Datas were processed by using ASTM E178 02 outlying methode forextreme value with 5 significant level The objective of this research is to create rheological models of shrinkage and creepof high performance concrete in humid tropical weather Shrinkage rheological model until the age of 1000 days is H N H N while forcreep is H N StV N Shrinkage correction factors for water ratio to cement w cm of 0 26 0 30 0 34 and 0 38 7 15 days are 1 1 1 2 1 and 2 3 respectively and for long term are 1 1 13 1 54 dan 1 65 Correction factors of cement amount wassimilar with correction factor of ACI 209R Humid tropical area caused maximum temperature in first 24 hours could reach 2times of maximum temperature in non humid tropical area full scale The maximumtemperature achievement was much faster that was a half of maximum temperatureachievement in non humid tropical area Reffered to ACI 209 R the rate of shrinkagein humid tropical area in short term is 1 1 and for long term is 4 1 times rate ACI209R for TAT 1 6 and 2 4 for DAT Creep rate of the both mixture was comparedwith ACI 209R 0 8 for short term and 1 8 for long term Long term shrinkage strainof TAT and DAT was 1 7 and 1 4 times ACI 209R while for creep was 1 3 and 1 , The research of shrinkage and creep in humid tropical weather area was done in highperformance concrete HPC fc of 6The research of shrinkage and creep in humid tropical weather area was done in high performance concrete (HPC) fcâ€™ of 60 MPa mixed with composition without fly ash called TAT and within fly ash called DAT. Three shrinkage specimens are 150Ñ…150Ñ…600 mm3 and one creep specimen is 200Ñ…600Ñ…2700 mm3. Loading was applied by prestressing of 0.3 fcâ€™in 15th day, the reinforcement was limited by that prestressing. Room was set in 28 Â± 3oC temperature and 72 Â± 5% humidity. Rheological models were created based on 800 days and 1000 days
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