ABSTRAK

ARSYUNI ALI MUSTARY. *Model Block Precast Hexagonal Kombinasi Vegetasi Rumput sebagai Proteksi Limpasan Permukaan pada Tebing* (dibimbing oleh Muhammad Saleh Pallu, Rita Tahir Lopa dan M. Arsyad Thaha).

Penelitian ini bertujuan untuk menganalisis pengaruh model tutupan tanah Block Precast Hexagonal dengan kombinasi vegetasi rumput terhadap laju limpasan permukaan *(surface run off)* sehingga koefisien limpasan "C" atau *land use factor*, ditentukan melalui persamaan umum sebagai suatu model. Penelitian model hidrologi ini memperkirakan besarnya aliran permukaan dari suatu luasan kecil dengan metode rasional melalui alat *Rainfallsimulator*. Variabel bebas penelitian adalah debit *surface run off* observasi (Qu), sedangkan Variabel terikat adalah Koefisien Limpasan (C). Hasil penelitian menunjukkan bahwa, ada reduksi limpasan permukaan rata-rata pada tutupan tanah kosong (T) sebesar 57 % dan nilai kisaran koefisien limpasan C = 0,291 – 0,520, sedangkan tutupan Tanah Rumput *Block Precast* (TRB) dapat mereduksi limpasan permukaan sebesar 82 % dan nilai kisaran koefisien C = 0,128 - 0,266. Kondisi percobaan pada kemiringan tanah mulai sedang sampai curam, dengan variasi Intensitas Curah hujan 61,6 – 110,5 mm/jam. Jadi ditemukan suatu parameter Waktu limpasan maksimum $t_{max} \approx$ (Q-2650/ -16,2432) (menit), kemiringan tanah, S ≈ (Q/30942) - 0,62006 (Derajad/ %) dan Intensitas Curah Hujan I ≈ (Q/9498,1) -3,3505 (mm/jam).

Kata Kunci ; *Laju Limpasan Permukaan, Tutupan Tanah, Rrainfallsimulator.*

ABSTRACT

ARSYUNI ALI MUSTARY. *The Hexagonal Precast Block Model of Grass Vegetation Combination as Surface Runoff Protection on Cliffs* (supervised by Muhammad Saleh Pallu, Rita Tahir Lopa and M. Arsyad Thaha).

The research aimed at analysing the effect of the land cover model of the Hexagonal Precast Block with the grass vegetation combination on the surface runoff rate, so that the runoff "C" coefficiency or *the land use factor* was determined througt the general equation as a model. The hydrological model research estimated the surface flow magnitude small area using the rational method through the Rainfallsimulator. The research independent variable was the observation runoff surface debit (Qu), while the independent variable was the runoff coefficiency (C). The research results indicates that there is the mean surface runoff reduction on the empty land cover (T) of 57% and runoff coefficiency approximation value C = 0.291 - 0.520 grass land (TRB) can reduce the surface runoff of 82 % and runoff coefficiency approximation value C = 0.128 - 0.266 . The experimental condition on the land slope starting from moderate to steep, with the rainfall intensity variations of 61.6 - 110.5 mm/hour. Thus it is obtained a maximum runoff time parameter t_{max} = (Q-2650/ -16,2432) (minute) the land slope ,S = (Q / 30942) - 0,62006 (degree (º) or %),and the rainfall Intensity I = (Q / 9498,1) -3,3505. (mm/ hour).

Key words ; Surface runoff rate, land cover, Rrainfall simulator.

ABSTRACT

ARSYUNI ALI MUSTARY. Hexagonal Precast Block Model Combine Grass Vegetation as Protection of Surface Runoff on Cliffs (supervised by Muhammad Saleh Pallu, Rita Tahir Lopa, M. Arsyad Thaha).

Cliff restoration to reduce surface runoff and erosion is a fundamental challenge in the management of the river basin.
Surface runoff and erosion are strongly influenced by soil cover and cliff slope, erosion is also affected by splash or rain impact factor collision factors, therefore soil cover with Hexagonal Precast Block Combined of Grass Vegetation allows for this purpose.

This study has been analyzed the effect of Hexagonal Precast Block land cover model with grass vegetation combination on surface runoff rate in the form of "C" runoff coefficient or land use factor, and find the general equation form produced by the model.
The form of this research is the study of hydrological models by modeling the estimated surface runoff from a small area using the rational method using Rainfallimulator tools, the independent variable of the research is the Debit run off observation (Qu), while the dependent variable is the runoff coefficient (C).
The results of the study found that the reduction of surface runoff on land without cover (T) compared with soil grass block precast (TRB) of 51.2% with a coefficient range value of C = 0.128 - 0.266 on moderate to steep slope with variations in rainfall intensity. The general equation produced is the maximum runoff time tmax = (Q / 2036.4) -1,15252, the slope of the land, S = Q / 30942) -0,62006, Rainfall Intensity I = (Q / 9498,1) -3 , 3505.

***Keywords**; Surface runoff rate, land cover, rainfall simulator.*

ARSYUNI ALI MUSTARY. Hexagonal Precast Block Model Combine with Grass Vegetation as Cliff Protection on Surface Runoff (supervised by **Muhammad Saleh Pallu, Rita Tahir Lopa, M. Arsyad Thaha).**

Rain is an important factor in the runoff rate, especially if the soil cover is not covered by vegetation, various methods to reduce surface runoff, the Hexagonal Precast Block Design of Combination of Grass Vegetation allows to reduce the runoff rate and minimize the impact of rainwater collision on the ground especially when vegetation has not grown well on cliffs. This study aims to: analyze the effect of the cliff protection model test using Hexagonal Precast Block with a combination of grass vegetation to run off rate.
The form of this research is the study of hydrological models by modeling the estimated surface runoff from a small area using the rational method using Rainfallimulator tools, this research model uses four models of soil cover, three variations of rainfall intensity (I) and three variations of land slope.
The results found that surface runoff capacity (Q) was also influenced by (land use factor) in the form of runoff coefficient (C), reduction of surface runoff on soil without cover (T) compared to Soil Block precast (TB) and Soil grass block precast (TRB) is 15% to 24%, while the comparison of the reduction of Soil cover (T) compared to the Soil Block precast (TB) and Soil grass block precast (TRB) is that the reduction in runoff is negative, it shows the addition of runoff of 15% for cover without grass vegetation (TB), and 6% for cover with grass

vegetation (TRB). The general equation produced from the results of hydrograph analysis that occurs in the variation of soil cover based on time in reaching a constant point, that the slope of the land has a dominant influence on time in reaching the constant point (t_{max}) of surface flow, so that an equation like x = Q / 2036.4 -1,15252, where x is the value (t_{max}) in minutes. Whereas general equations resulting from the results of linear regression between changes in surface flow rates due to increased intensity and slope of the land on variations in soil cover produce equations, among others; x = Q / 30942-0,62006, where the slope value of the land can be obtained from the results of x multiplied by the average slope of the ground slope, equation Q = 9498,1x + 31824, to obtain the amount of Rainfall Intensity so that the value of x can be determined, x = Q / 9498,1-3,3505, where the value of rainfall intensity can be obtained from the results of x multiplied by the average interval of rainfall intensity.

Keywords: Surface runoff rate, land cover, rainfall simulator.

Hujan merupakan faktor penting dalam laju limpasan permukaan *(runoff)* apalagi jika tutupan tanah tidak tertutupi oleh vegetasi , berbagai metode untuk mengurangi limpasan permukaan, disain Block Precast Hexagonal Kombinasi Vegetasi Rumput memungkinkan untuk memperkecil laju limpasan permukaan dan memperkecil efek tumbukan air hujan ke tanah apalagi saat vegetasi belum tumbuh dengan baik pada tebing. Penelitian ini bertujuan untuk : menganalisis pengaruh uji model proteksi tebing menggunakan Block Precast Hexagonal dengan kombinasi vegetasi rumput terhadap laju limpasan permukaan *(run off).*

Bentuk penelitian ini adalah penelitian model hidrologi dengan memodelkan perkiraan besarnya aliran permukaan dari suatu luasan kecil dengan menggunakan metode rasional menggunakan alat *Rainfallsimulator*, model penelitian ini menggunakan empat model Tutupan Tanah, tiga variasi Intensitas Curah hujan (I) serta tiga variasi kemiringan tanah.

Hasil penelitian menemukan bahwa kapasitas limpasan permukaan (Q) juga dipengaruhi oleh (*land use factor)* dalam bentuk koefisien limpasan (C) , reduksi limpasan permukaan pada tanah tanpa tutupan (T) dibanding dengan Tanah Block precast (TB) dan Tanah rumput block precast (TRB) sebesar 15 % sampai 24 %, sedangkan perbandingan reduksi Tanah tutupan rumput (T) dibanding dengan Tanah Block precast (TB) dan Tanah rumput block precast (TRB) diperoleh reduksi limpasan bernilai negative hal tersebut menunjukkan penambahan limpasan yakni sebesar 15 % untuk tutupan tanpa vegetasi rumput (TB), dan 6 % untuk tutupan dengan vegetasi rumput (TRB). Persamaan umum yang dihasilkan dari hasil analisis hidrograf yang terjadi pada variasi tutupan tanah berdasarkan waktu dalam mencapai titik konstan, bahwa kemiringan tanah berpengaruh dominan terhadap waktu dalam mencapai titik konstan (t_{max}) aliran permukaan, sehingga dihasilkan persamaan seperti, $x = \frac{Q}{2036,4} - 1,15252$, dimana x merupakan nilai (t_{max}) dalam menit. Sedangkan persamaan umum yang dihasilkan dari hasil regresi linear antara perubahan laju aliran permukaan akibat peningkatan Intensitas dan kemiringan tanah pada variasi tutupan tanah menghasilkan persamaan antara lain ; $x = \frac{Q}{30942} - 0,62006$, dimana nilai kemiringan tanah dapat diperoleh dari hasil x dikalikan dengan interval rata-rata kemiringan tanah , persamaan $Q = 9498,1x + 31824$, untuk memperoleh besarnya Intensitas Curah hujan sehingga nilai x dapat ditentukan , $x = \frac{Q}{9498,1} - 3,3505$, dimana nilai Intensitas Curah hujan dapat diperoleh dari hasil x dikalikan dengan interval rata-rata Intensitas curah hujan.

Kata Kunci : *Laju Limpasan Permukaan, tutupan tanah, rainfall simulator.*

MODEL *REVETMENT* TEBING SUNGAI DENGAN *BLOCK PRECAST HEXAGONAL* KOMBINASI VEGETASI RUMPUT

Arsyuni Ali Mustary[1], Muh. Saleh Pallu[2], Rita Tahir Lopa[3], Arsyad Thaha[4]

1. Mahasiswa Program Pasca Sarjana Program Studi Teknik Sipil Universitas Hasanuddin
2. Dosen Promotor Program Studi Teknik Sipil Universitas Hasanuddin
3. Dosen Co promotor 1 Program Studi Teknik Sipil Universitas Hasanuddin
4. Dosen Co promotor 2 Program Studi Teknik Sipil Universitas Hasanuddin

Email: nzakiyah009@gmail.com

ABSTRAK

Penanganan keruntuhan pada tebing sungai atau pada saluran buatan biasanya dilakukan dengan perkuatan beton atau lining, seiring dengan berkembangnya konsep ekohidrolik , kini banyak diterapkan perkuatan tebing dengan penanaman berbagai jenis tanaman. Kedua konsep ini memiliki kelebihan dan kekurangan, untuk itu kami mengevaluasi kombinasi kedua konsep tersebut dengan menguji model blok beton precast hexagonal dengan kombinasi vegetasi rumput yang berfungsi sebagai penguat tebing. Kombinasi konsep ini diharapkan dapat mendukung fungsi sungai sebagai pengendali banjir, memperbaiki estetika sungai dan semakin memudahkan akses ke sungai. Tujuan penelitian ini adalah untuk mengetahui pengaruh dan kinerja model blok beton precash hexagonal dengan anchor road vetiver terhadap longsoran, gerusan dan ekohidrolik sungai, juga untuk mengetahui hubungan perkuatan tebing model tersebut terhadap longsor dan gerusan yang terjadi pada tebing sungai.

Pengambilan sampel dilakukan dengan mengambil tanah pada tebing sungai untuk dijadikan model dengan kemiringan tertentu , selanjutnya pembuatan / pencetakan model precash hexagonal dengan ukuran dan model yang telah ditentukan, bersamaan itu pula sudah di buat formasi penanaman rumput vetiver pada model tanah yang disesuaikan dengan ukuran precash hexagonal berlubang , setelah rumput vetiver tumbuh dan akarnya sudah menancap dan menyebar kedalam tanah yang berfungsi sebagai anchor road, lalu dilakukan pengujian kinerja model terhadap longsoran tebing dengan rainfall simulator, sedangakan pengujian model terhadap ekohidrolik sungai dengan menghitung kapasitas oksigen yang dihasilkan dari model tersebut, sementara untuk mengukur besarnya gerusan terhadap model dilakukan pengaliran air dengan variasi debit aliran air pada flume dengan model tebing yang telah disediakan.

Hasil penelitian menunjukkan persamaan matematis pengaruh model kombinasi blok precash hexagonal dengan tanaman vetiver yang berfungsi anchor road terhadap perkuatan tebing dari bahaya longsor , gerusan dan pengaruh model terhadap ekohidrolik sungai.

Kata Kunci, *Revetment, Blok Precash Hexagonal, Vegetasi rumput, Ekohidrolik*

REVETMENT RIVERBANK MODEL BLOCK PRECAST HEXAGONAL COMBINATION WITH GRASS VEGETATION

Arsyuni Ali Mustary[1], Muh. Saleh Pallu[2], Rita Tahir Lopa[3], Arsyad Thaha[4]

1. Students Graduate Program in Civil Engineering Program , University of Hasanuddin
2. The Promoter Lecturer Civil Engineering Program , University of Hasanuddin
3. Lecturer Co promoter 1 Civil Engineering Program , University of Hasanuddin
4. Lecturer Co promoter 2 Civil Engineering Program , University of Hasanuddin

Email: nzakiyah009@gmail.com

ABSTRACT

Handling a landslide on the river bank or in the artificial channel is usually done with concrete reinforcement or lining, along with expanding the concept ekohidrolik, is now being applied to the retrofitting of a cliff by planting various types of plants. Both of these concepts have advantages and

disadvantages, so we evaluate the combination of these two concepts by testing models precash hexagonal concrete blocks with a combination of vetiver plants that serve as anchor road. The combination is expected to support the concept of river functions as flood control, improve the aesthetics of the river and even easier access to the river. The purpose of this study was to determine the effect and performance models precash hexagonal concrete blocks to anchor vetiver road against avalanches, scouring and ekohidrolik river, also to determine the relationship of the cliff retrofitting these models to landslides and scouring that occurs on the riverbank.

Sampling was done by taking land on the river bank to serve as a model with a certain slope, then the making / printing models precash hexagonal with sizes and models that have been determined, together with it also had made the formation planting vetiver grass in soil models that are tailored to the size precash hexagonal perforated, after vetiver grass grow and the roots are stuck and spread into the soil that serves as anchor road, and then testing the model performance against avalanches cliff with a rainfall simulator, while the testing of models against ekohidrolik river by calculating the capacity of the oxygen generated from the model, while for measure the size of the model are scouring the drainage water with the variation of flow rates in flume with a model of the cliff that has been provided.

The results showed a mathematical equation models the effect of combination of blocks precash hexagonal with vetiver plant that serves anchor cliff road towards the retrofitting of the danger of landslides, scouring and influence of the model against ekohidrolik river.

Key Words : *Rivetmrnt, Precast Block Hexagonal, grass vegetation, Ecohidraulic*