

**KAJIAN KEANDALAN METODE HIDROGRAF SATUAN SINTETIK
(HSS) NAKAYASU, GAMA-I, DAN SCS-CN
UNTUK PENETAPAN BANJIR RANCANGAN
PADA DAS CITANDUY HULU**

Ade Siska Agustina¹, Pengki Irawan², Fitriana Sarifah³

Jurusan Teknik Sipil, Fakultas Teknik, Universitas Siliwangi

Jalan Siliwangi No.24 Tasikmalaya, Jawa Barat, Indonesia

E-mail: 217011020@student.unsil.ac.id

ABSTRAK

Banjir merupakan bencana alam yang kerap terjadi di wilayah DAS Indonesia, termasuk di wilayah Sub DAS Citanduy Hulu yang memiliki karakteristik hidrologi kompleks serta perubahan tata guna lahan signifikan. Sehingga proses perencanaan infrastruktur pengendalian banjir memerlukan analisis debit banjir rancangan yang akurat dengan metode hidrograf satuan. Penelitian ini bertujuan untuk mengevaluasi keandalan metode HSS, yaitu Nakayasu, GAMA-I, dan SCS-CN dalam merepresentasikan karakteristik debit limpasan, kemudian dibandingkan dengan debit aktual berdasarkan analisis HSP metode Collins. HSP Collins dimodelkan berdasarkan data curah hujan dan debit observasi tahun 2020 dan 2022. Sementara, HSS dimodelkan berdasarkan parameter morfometri DAS dan hujan efektif sebesar 1 mm, dengan SCS-CN dianalisis menggunakan bantuan perangkat lunak HEC-HMS. Hasil penelitian menunjukkan bahwa Q_p dari HSP Collins sebesar 22,86 m³/dt/mm, sedangkan Q_p dari HSS Nakayasu sebesar 23,99 m³/dt/mm, GAMA-I sebesar 25,44 m³/dt/mm, dan SCS-CN sebesar 24,40 m³/dt/mm. Uji penyimpangan ordinat HSS terhadap HSP menunjukkan bahwa metode Nakayasu memiliki deviasi terkecil yaitu 5,15%, dibandingkan SCS-CN sebesar 7,02%, dan GAMA-I 11,73%. Dengan demikian, metode HSS Nakayasu dinilai paling mendekati data aktual dan direkomendasikan untuk penetapan banjir rancangan di Sub DAS Citanduy Hulu PDA Cirahong.

Kata Kunci: Das Citanduy Hulu, HSP Collins, HSS Nakayasu, GAMA-I, dan SCS-CN.

¹Mahasiswa Jurusan Teknik Sipil Fakultas Teknik Universitas Siliwangi

²Dosen Pembimbing Tugas Akhir 1, Dosen Teknik Sipil Universitas Siliwangi

³Dosen Pembimbing Tugas Akhir 2, Dosen Teknik Sipil Universitas Siliwangi

**RELIABILITY ASSESSMENT OF THE NAKAYASU, GAMA-I, AND
SCS-CN SYNTHETIC UNIT HYDROGRAPH (SUH) METHODS
FOR DESIGN FLOOD DETERMINATION
IN THE UPSTREAM CITANDUY WATERSHED**

Ade Siska Agustina¹, Pengki Irawan², Fitriana Sarifah³

Department of Civil Engineering, Faculty of Engineering, Siliwangi University
Siliwangi St No. 24 Tasikmalaya, West Java, Indonesia
E-mail: 217011020@student.unsil.ac.id

ABSTRACT

Flooding is a natural disaster that often occurs in Indonesian watershed areas, including in the Upstream Citanduy Subwatershed area which has complex hydrological characteristics and significant land use changes. Therefore, the flood control infrastructure planning process requires an accurate design flood discharge analysis using the unit hydrograph method. This research aims to evaluate the reliability of SUH methods, namely Nakayasu, GAMA-I, and SCS-CN in representing runoff discharge characteristics, then compared with actual discharge based on HSP analysis of Collins method. Collins' OUH was modeled based on observed rainfall and discharge data for 2020 and 2022. Meanwhile, HSS was modeled based on watershed morphometric parameters and effective rainfall of 1 mm, with SCS-CN analyzed using HEC-HMS software. The results showed that the Q_p from Collins HSP was 22,86 m³/s/mm, while the Q_p from Nakayasu HSS was 23,99 m³/s/mm, GAMA-I was 25,44 m³/s/mm, and SCS-CN was 24,40 m³/s/mm. The HSS ordinate deviation test against HSP shows that the Nakayasu method has the smallest deviation of 5,15%, compared to SCS-CN at 7,02%, and GAMA-I at 11,73%. Thus, the Nakayasu HSS method is considered the closest to the actual data and is recommended for design flood determination in the Upstream Citanduy Subwatershed at Cirahong River Gauge Station.

Keywords: The Upstream Citanduy Subwatershed, OUH Collins, SUH Nakayasu, GAMA-I, and SCS-CN.

¹Student of Civil Engineering Department, Faculty of Engineering Siliwangi University

²Supervisor of Final Project 1, Civil Engineering Lecturer, Siliwangi University

³Supervisor of Final Project 2, Civil Engineering Lecturer, Siliwangi University