

INTISARI

Banjir merupakan fenomena alam yang sering terjadi di beberapa wilayah Provinsi Jawa Tengah pada saat musim hujan. Daerah Airan Sungai (DAS) Jragung Wilayah Sungai (WS) Jratunseluna terdapat di Provinsi Jawa Tengah sering mengalami bencana banjir. Dalam Pola Pengelolaan WS Jratunseluna direncanakan penanggulangan bencana banjir sistem Sungai Jragung dengan membangun Bendungan Jragung. Kinerja Bendungan Jragung dalam pengendalian banjir di DAS Jragung perlu dikaji dari faktor nilai penurunan debit banjir, nilai peredaman banjir, perubahan muka air banjir, dan waktu perjalanan air banjir.

Penelusuran hidrologi aliran banjir waduk dan Sungai Jragung bagian hulu sampai Bendung Jragung menggunakan bantuan perangkat lunak HEC-HMS, sedangkan penelusuran hidraulika aliran banjir setelah Bendung Jragung menggunakan perangkat lunak HEC-RAS. Simulasi penelusuran aliran banjir dilakukan dengan dua kondisi yaitu simulasi I kondisi eksisting dan simulasi II kondisi setelah ada Bendungan Jragung. Hasil penelusuran aliran dibandingkan untuk melihat kinerja pembangunan Bendungan Jragung.

Hasil penelitian simulasi aliran banjir setelah dibangun bendungan menunjukkan bahwa Sungai Jragung mampu mengalirkan aliran debit banjir untuk kala ulang 2, 5 dan 10 tahun. Bendungan Jragung mampu menurunkan debit puncak banjir di Bendung Jragung dengan nilai sekitar 41% dengan nilai peredaman banjir di bangunan pelimpah Bendungan Jragung sekitar 77%. Penurunan kedalaman muka air banjir cukup besar terjadi di Sungai Cabean antara 0,71 m sampai dengan 1,45 m, sedangkan penurunan kedalaman muka air banjir paling rendah terjadi di Sungai Jragung hilir dan pertemuan Sungai Cabean-Sungai Kali Buangan 1 dengan nilai penurunan antara 0,10 m sampai dengan 0,38 m. Bendungan Jragung dapat meningkatkan *travel time* banjir di Sungai Cabean rata-rata 1 jam lebih lama pada debit banjir kala ulang 2 tahun sampai dengan 50 tahun.

Kata kunci: pengendalian banjir, penelusuran banjir, peredaman banjir, *travel time*.

ABSTRACT

Flooding is a natural phenomenon that often occurs in some parts of Central Java province during the rainy season. Jragung watershed is part of Jratunseluna river basin located in the region of Semarang and Demak, Grobogan, Central Java province, and often experience flood. Jratunseluna river basin management plan in 2010, have planned a flood disaster management for Jragung river system, one of the plan is to build a Dam. The performance of the Jragung Dam in Jragung watershed flood control need to be assessed by monitoring the decrease values in discharge flood, dumping efficiency values, changes of the flood water level, and flood travel time.

Hydrologic flood routing in reservoirs and in the upper Jragung River to the Jragung Weir was done by using software HEC-HMS, while the hydraulics flood routing after the Jragung Weirs by using HEC-RAS. Flood routing simulation were carried out with two conditions namely simulation I for existing condition and simulation II for the conditions after Jragung Dam was built. The results were compared to see the performance of Jragung Dam.

The results of the flood simulation at Jragung river after the dam was built indicates that the Jragung river was able to flow the flood discharge for 2, 5 and 10 years return periode. Jragung Dam was able to decrease the flood peak discharge that goes into Jragung Weirs by 41% with dumping efficiency values at spillway of Jragung Dam around 77%. Maximum decreasing depth of the flood flow occurred in Cabean River is between 0.71m up to 1.45m. While the minimum decreasing depth of the flood water flow occurred in the lower Jragung River and the junction of Cabean river and Kali Buangan river is between 0.10m up to 0.38m. Jragung Dam increases travel time in Cabean river on average of 1 hour at flood discharge from 2 years up to 50 years return period.

Key word: flood control, flood routing, dumping efficiency, travel time