

INTISARI

Pasca erupsi Merapi 2010, merupakan yang terburuk dalam periode Merapi Baru (abad 17–20). Kerugian yang ditimbulkan mencakup beberapa sektor hingga korban jiwa. Adapun dampak sekunder yang timbul pasca erupsi Merapi 2010 adalah banjir bandang khususnya saat musim hujan. Banjir bandang yang bersifat destruktif ini, menimbulkan kerusakan terhadap bangunan-bangunan di sungai maupun objek-objek vital disekitarnya. Meskipun beberapa bangunan yang rusak telah dibangun kembali, namun kejadian-kejadian banjir yang menimbulkan kerusakan masih terjadi. Oleh sebab itu, penelitian ini bertujuan untuk mengetahui efektivitas rangkaian bangunan sabodam dalam meredam banjir bandang. Selain itu, mengidentifikasi dan mengevaluasi kondisi eksisting bangunan-bangunan tersebut dan memberikan rekomendasi perbaikan dan/atau peningkatan kinerja bangunan.

Metode yang digunakan untuk mengetahui efektivitas peredaman banjir bandang dengan cara melakukan simulasi model matematis. Simulasi model aliran terdiri dari dua skenario, dengan sabodam dan tanpa sabodam. Ketahanan rangkaian sabodam di Sungai Boyong dilihat berdasarkan kondisi eksisting rangkaian sabodam dan jarak antar bangunan berdasarkan teori teknologi sabo dan pengamatan visual.

Berdasarkan hasil analisis, diketahui bahwa keberadaan sabodam mampu meredam banjir bandang dengan reduksi kecepatan aliran rerata 32–37%. Kecepatan maksimum 5,023 m/detik ditemui diantara BO-D4 dan BO-C5. Sedangkan kecepatan maksimum berkisar 5,89–7,94 m/detik berada diantara BO-C6 dan BO-C7. Pasca erupsi Merapi 2010, keempat sabodam tersebut telah direhabilitasi. Selain itu, korelasi antara kemiringan sungai dan pengaturan jarak yang belum efektif berpotensi menimbulkan dampak yang sama di masa datang. Meskipun ketahanan rangkaian sabodam di Sungai Boyong dengan usia guna 13 tahun secara umum menunjukkan kinerja yang baik, namun pemeliharaan yang tepat tetap diperlukan. Pengaturan jarak berupa penambahan bangunan pada rangkaian sabodam direkomendasikan untuk meningkatkan kestabilan bangunan dalam menghadapi ancaman banjir bandang dan keberlanjutan suatu bangunan.

Kata kunci: Banjir bandang, Efektivitas, Sabodam, Gunung Merapi, Kali Boyong

ABSTRACT

The 2010 Merapi eruption was the worst during the New Merapi period (17th–20th centuries). The resulting losses spanned several sectors, including numerous fatalities. A secondary impact following the 2010 Merapi eruption was flash floods, particularly during the rainy season. These destructive flash floods caused damage to buildings along the river and surrounding vital objects. Although some damaged buildings have been rebuilt, damaging floods still occur. Therefore, this study aims to determine the effectiveness of a series of dam structures in mitigating flash floods. Furthermore, it identifies and evaluates the existing condition of these structures and provides recommendations for repairs and/or improvements to their performance.

The method used to determine the effectiveness of flash flood mitigation was a mathematical model simulation. The flow model simulation consisted of two scenarios: with and without a dam. The resilience of the dam network on the Boyong River was assessed based on the existing condition of the dam network and the spacing between structures, using Sabo technology theory and visual observations.

Based on the analysis, it was found that the dam network was able to mitigate flash floods with an average flow velocity reduction of 32–37%. The maximum velocity of 5.023 m/s was found between BO-D4 and BO-C5. Meanwhile, the maximum velocity ranged from 5.89 to 7.94 m/s between BO-C6 and BO-C7. Following the 2010 Merapi eruption, all four dams were rehabilitated. Furthermore, the correlation between river slope and ineffective spacing has the potential to cause similar impacts in the future. Although the dam network on the Boyong River, with a lifespan of 13 years, generally demonstrates good performance, proper maintenance is still necessary. Spacing adjustments, such as the construction of new sabo dams within the series of sabodam are recommended to improve the stability of the structures in the face of flash floods and their sustainability.

Keywords: *Flash flood, Effectiveness, Sabodam, Mt. Merapi, Kali Boyong.*