

ABSTRAK

ANALISIS POLA OPERASI BUKAAN PINTU BANGUNAN RAMAN UTARA 4 (BRU 4) BERDASARKAN DEBIT ANDALAN 80%

Oleh

RAHMALIA PUTRI

Pengaturan distribusi air irigasi yang presisi sangat penting bagi produktivitas pertanian. Penelitian ini bertujuan menganalisis ketersediaan debit andalan 80% di Bendung Raman, mengevaluasi kapasitas fisik saluran, dan menentukan tinggi bukaan pintu air optimal pada Bangunan Raman Utara 4 (BRU 4). Metode yang digunakan meliputi metode tahun dasar (*basic year method*) untuk analisis hidrologi, serta persamaan *manning* dan kurva *schmidt* untuk evaluasi parameter hidrolika pintu sorong.

Hasil analisis menunjukkan debit andalan 80% (Q_{80}) Sungai Way Raman mencapai 22,18 m³/s. Mengingat kapasitas total maksimum saluran eksisting (primer BRU 4 dan sekunder BA 1 dan BC 1) hanya sebesar 18,52 m³/s, maka operasional pintu air dibatasi sesuai target kebutuhan skema irigasi guna mencegah risiko luapan (*overtopping*). Berdasarkan perumusan *rating curve*, rekomendasi tinggi bukaan pintu pada elevasi muka air hulu normal ($h_1 = 1,32\text{m}$) adalah 0,90-0,95m (BRU 4), 0,30-0,35m (BA 1), dan 0,10-0,15m (BC 1). Saat elevasi muka air hulu rendah ($h_1=0,99\text{ m}$), tinggi bukaan disesuaikan secara dinamis menjadi 0,70-0,75m (BRU 4), 0,45-0,50m (BA 1) dan 0,10-0,15m (BC 1) agar distribusi aliran tetap akurat, aman, dan efisien.

Kata Kunci: debit andalan, pintu sorong, pola operasi pintu, tinggi bukaan pintu.

ABSTRACT

ANALYSIS OF GATE OPENING OPERATION PATTERN AT RAMAN UTARA 4 (BRU 4) STRUCTURE BASED ON 80% DEPENDABLE FLOW

By

RAHMALIA PUTRI

Precise regulation of irrigation water distribution is crucial for agricultural productivity. This study aims to analyze the availability of the 80% dependable flow at the Raman Weir, evaluate the physical capacity of the channels, and determine the optimal gate opening height at the Raman Utara 4 (BRU 4) structure. The methods used include the basic year method for hydrological analysis, along with the manning equation and the schmidt curve for evaluating the hydraulic parameters of the sluice gate.

The analysis results show that the 80% dependable flow (Q_{80}) of the river reaches 22.18 m³/s. Given that the maximum total capacity of the existing channels (primary BRU 4 and secondary BA 1 and BC 1) is only 18.52 m³/s, the gate operation is strictly limited according to the irrigation scheme target requirements to prevent the risk of overtopping. Based on the rating curve formulation, the recommended gate opening heights at a normal upstream water level elevation ($h_1 = 1.32$ m) are 0.90-0.9 m (BRU 4), 0.30-0.35 m (BA 1), and 0.10-0.15 m (BC 1). When the upstream water level elevation is low ($h_1 = 0.99$ m), the opening heights are dynamically adjusted to 0.70-0.75 m (BRU 4), 0.45-0.50 m (BA 1), and 0.10-0.15m (BC 1) to ensure the flow distribution remains accurate, safe, and efficient.

Keywords: dependable flow, sluice gate, gate operation pattern, gate opening height.