

INTISARI

Saluran buatan jenis saluran terbuka yang mempunyai banyak belokan, sulit untuk memprediksi distribusi konsentrasi sedimen suspensi karena perubahan kecepatan aliran dan proses morfologi di belokan saluran terbuka. Distribusi konsentrasi sedimen suspensi pada belokan saluran terbuka tampang trapesium, diketahui relatif berbeda dengan saluran lurus dan belokan saluran tampang lain, dimana pengaruh belokan saluran serta bentuk tampang berperan terhadap konsentrasi sedimen suspensi yang akan terjadi. Tujuan penelitian ini adalah mengetahui konsentrasi sedimen suspensi pada belokan saluran terbuka tampang trapesium, kemudian hasil yang diperoleh dibandingkan dengan Persamaan Rouse dan Persamaan Tanaka – Sugimoto serta mengetahui pengaruh sudut belokan dan panjang jari-jari belokan.

Penelitian ini dilakukan di 3 (tiga) lokasi belokan saluran terbuka tampang trapesium pada saluran irigasi Mataram Yogyakarta, Indonesia. Penelitian dilakukan dengan sudut dan jari-jari belokan yang bervariasi, mulai dari belokan yang mempunyai sudut, $\alpha = 36^\circ$ dengan $r = 176$ m, $\alpha = 73^\circ$ dengan $r = 126$ m dan $\alpha = 54^\circ$ dengan $r = 113.5$ m. Kecepatan dan konsentrasi sedimen suspensi diukur menggunakan *Propeller Currentmeter* dan *Opcon Probe*.

Berdasarkan hasil pembahasan penelitian ini bahwa, nilai konsentrasi sedimen suspensi rata-rata tampang di *inner bank* lebih besar dari pada di *outer bank* untuk arah transversal. Nilai konsentrasi sedimen suspensi rata-rata tampang dapat ditentukan berdasarkan nilai rata-rata vertikal kedalaman aliran dengan lokasi pengambilan sampel pada posisi z/B *inner bank* = 0,22 dan pada posisi z/B *outer bank* = 0,86 mewakili nilai rata-rata konsentrasi sedimen suspensi di penampang saluran. Debit sedimen suspensi pada belokan saluran tampang trapesium dapat ditentukan dari pengukuran kecepatan dan konsentrasi sedimen suspensi pada posisi z/B *inner bank* = 0,29 dan pada posisi z/B *outer bank* = 0,86 dari lebar penampang saluran trapesium. Persamaan Rouse masih dapat digunakan untuk memprediksi distribusi sedimen suspensi untuk posisi di tengah saluran awal belokan dan posisi selain di tengah saluran awal belokan, persamaan Rouse perlu dikoreksi. Pengaruh sudut belokan terhadap konsentrasi sedimen suspensi untuk posisi di *inner bank* yaitu semakin besar sudut belokan maka nilai konsentrasi sedimen suspensi semakin kecil, sedangkan semakin panjang jari-jari belokan maka semakin besar nilai konsentrasi sedimen suspensi yang terjadi di *inner bank*.

Kata kunci: konsentrasi sedimen suspensi, saluran trapesium, belokan saluran, debit sedimen suspensi

ABSTRACT

It is difficult to predict the distribution of suspended sediment concentration in an artificial open channel with many water bends due to changes in flow velocity and morphology process in the curved open channel. Distribution of suspended sediment concentration in the trapezoidal shape of curved open channel is known to be relatively different from that on the straight channel and the other channel bend section, where the influence of channel bends and section shape contribute to suspended sediment concentration that will occur. The research was conducted to determine the concentration of suspended sediment in the trapezoidal shape of curved open channel. The results then will be compared to the Rouse and Tanaka - Sugimoto Equation, and determine the influence of bend angle and radius.

This research was conducted in three (3) locations of the trapezoidal shape of curved open channel at irrigation canals, Mataram Yogyakarta, Indonesia. There were various angles and radius of the bend, ranged from the bend angle of $\alpha = 36^\circ$ with radius $r = 176$ m, $\alpha = 73^\circ$ with $r = 126$ m, and $\alpha = 54^\circ$ with $r = 113.5$ m. The velocity and suspended sediment concentration were measured by Propeller Currentmeter and Opcon Probe.

Based on the results of the discussion of this research that, the value cross-section average of suspended sediment concentration at the inner banks is bigger than in the outer bank to the transverse direction. The value of suspended sediment concentration on the trapezoidal curved channel can be determined from measurement of suspended sediment concentration sampling at the position of z/B inner bank = 0.22 and at the position of z/B outer banks = 0.86, and the sampling for suspended sediment discharge at the position of z/B inner bank = 0.29 and at the position of z/B outer banks = 0.86 of the trapezoidal cross-section channel width which represents the average value of the trapezoidal cross-section channel. Rouse equation can still be used to predict the distribution of suspended sediment at the main of the initial curved channel and at the other position except at the center area where the Rouse equation needs to be corrected. The influence of bend angles towards the suspended sediment concentration at the inner bank are the bigger bend angle, the smaller suspended sediment concentration values, and the longer the bend radius, the bigger suspended sediment concentration at the inner bank.

Keywords: suspended-sediment concentraion, trapezoid channel, curved channel, suspended-sediment discharge