ABSTRACT

The piping system has an importan role in distributing fluids in industry, including in the production process at PT Indah Kiat Pulp & Paper Tbk. *Problems in the field occurred when storage – 144 in the deinking section had to be temporarily deactivated because repairs were being carried out. This causes the distribution of fresh water fromm storage – 145 to the dilution storage to be disrupted. Therefore, a by-pass piping system was designed that allows direct distribution from storage – 145 to the dilution storage without going through storage – 144. This study aims to analyze the effect of the design configuration of the pipe by-pass system on the total head value, and to determine the appropriate pump capacity. The methods used include field observation, interviews with operators, and comparison with previous studies. Data analysis was performed by calculating the total system head values such as elevation head, pressure head, velocity head, and head loss. Six piping by-pass design configurations were analyzed and compared. The results show that the configuration with the optimal pipe length and number of fittings produces a lower total head value. The best design has a total head value of 44,95 m, and is still below the existing pump capacity of 50 m. In addition, based on the approach to the ASME B31 standard, the overdesign or safety factor for the piping system head is 10% of the pump head. This by-pass system is used as a reference in mitigating operational disruptions of the piping system in the future.*

Keywords**:** *Design, Piping, Analysis, Head Total, Pump*.

INTISARI

Sistem perpipaan memiliki peran penting dalam mendistribusikan fluida pada industri, termasuk dalam proses produksi di PT Indah Kiat Pulp & Paper Tbk. Permasalahan di lapangan terjadi ketika *storage* – 144 di *deinking section* harus dinonaktifkan sementara waktu karena akan dilakukan perbaikan. Hal tersebut mengakibatkan distribusi *fresh water* dari *storage* – 145 menuju *storage* dilusi menjadi terganggu. Oleh karena itu, dirancanglah sistem *by-pass* perpipaan yang memungkinkan distribusi langsung dari *storage* – 145 menuju *storage* dilusi tanpa melalui *storage* – 144. Penelitian ini bertujuan untuk menganalisis pengaruh konfigurasi desain sistem *by-pass* pipa terhadap nilai *head* total, serta menentukan kapasitas pompa yang sesuai. Metode yang digunakan meliputi observasi lapangan, wawancara dengan operator, serta membandingkan dengan penelitian terdahulu. Analisis data dilakukan dengan menghitung nilai *head* total sistem seperti *head* elevasi, *head* tekanan, *head* kecepatan, dan *head loss*. Enam konfigurasi desain *by-pass* perpipaan dianalisis dan dibandingkan. Hasilnya menunjukkan bahwa konfigurasi dengan panjang pipa dan jumlah *fitting* yang optimal menghasilkan nilai *head* total lebih rendah. Rancangan terbaik memiliki nilai *head* total sebesar 44,95 m, dan masih berada di bawah kapasitas pompa yang ada yaitu 50 m. Selain itu, berdasarkan pendekatan terhadap standar ASME B31, *overdesign* atau *safety factor* untuk *head* sistem perpipaan sebesar 10% dari *head* pompa. Sistem *by-pass* ini dijadikan referensi dalam mitigasi gangguan operasional sistem perpipaan di masa depan.

Kata kunci: Perancangan, Perpipaan, Analisis, *Head* Total, Pompa.