

STUDI EKSPERIMENTAL PERFORMANSI POMPA SENTRIFUGAL TIPE CALPEDA B CM 20E SEBAGAI ALAT PRAKTIKUM

ABSTRAK

Pompa sentrifugal merupakan salah satu mesin fluida yang banyak digunakan dalam bidang industri maupun sebagai media pembelajaran pada praktikum Mekanika Fluida. Penelitian ini bertujuan untuk mengetahui karakteristik performa pompa sentrifugal tipe Calpeda B CM 20E melalui pengujian eksperimental, menghitung daya pompa serta menyusun kurva karakteristik performa, serta mengembangkan alat praktikum melalui penyempurnaan sistem perpipaan menggunakan komponen transparan dan penambahan *digital flow meter*, sehingga proses pengamatan aliran fluida dapat dilakukan secara lebih jelas dan pengukuran debit menjadi lebih akurat. Penelitian ini menggunakan metode eksperimen dengan empat variasi bukaan keran hisap, yaitu 0 putaran, 0,25 putaran, 0,50 putaran, dan 0,75 putaran. Data hasil pengujian meliputi debit aliran, tekanan sisi hisap, tekanan sisi tekan, dan putaran motor yang selanjutnya digunakan untuk menghitung head total, daya pompa, efisiensi pompa, dan efisiensi motor. Hasil penelitian menunjukkan bahwa semakin besar pembatasan bukaan keran hisap, debit aliran, head total, efisiensi pompa, dan efisiensi motor cenderung mengalami penurunan. Pengembangan alat praktikum menggunakan pipa transparan, *elbow* transparan, dan *digital flow meter* memungkinkan aliran fluida di dalam sistem perpipaan diamati secara langsung sehingga mempermudah identifikasi karakteristik aliran selama pompa beroperasi. Selain itu, penggunaan *digital flow meter* memberikan kemudahan dalam pengukuran debit secara lebih praktis, akurat, dan *real-time*. Dengan demikian, pengembangan alat praktikum yang dilakukan tidak hanya mendukung pengujian performa pompa sentrifugal, tetapi juga meningkatkan fungsi alat sebagai media pembelajaran Mekanika Fluida yang lebih interaktif dan representatif.

Kata kunci: pompa sentrifugal, performa pompa, pengujian eksperimental, pengembangan alat praktikum, *digital flow meter*

Experimental Study of the Performance of the Calpeda B CM 20E Centrifugal Pump as a Laboratory Training Apparatus

ABSTRAK

Centrifugal pumps are widely used in industrial applications and also serve as learning media in Fluid Mechanics laboratory courses. This study aims to determine the performance characteristics of the Calpeda B CM 20E centrifugal pump through experimental testing, calculate the pump power and develop the pump performance characteristic curves, as well as improve the laboratory training equipment by upgrading the piping system with transparent components and the installation of a digital flow meter, thereby providing clearer visualization of fluid flow and more accurate flow rate measurements. The study employed an experimental method using four suction valve opening variations, namely 0 turn, 0.25 turn, 0.50 turn, and 0.75 turn. The experimental data consisted of flow rate, suction pressure, discharge pressure, and motor rotational speed, which were subsequently used to calculate the total head, pump power, pump efficiency, and motor efficiency. The results indicate that increasing the restriction of the suction valve opening leads to a decrease in flow rate, total head, pump efficiency, and motor efficiency. Furthermore, the development of the laboratory training equipment using transparent pipes, transparent elbows, and a digital flow meter enables direct observation of fluid flow within the piping system, making it easier to identify flow characteristics during pump operation. In addition, the digital flow meter provides a more practical, accurate, and real-time method for measuring flow rate. Therefore, the developed laboratory training equipment not only supports centrifugal pump performance testing but also enhances its function as a more interactive and representative learning medium for Fluid Mechanics laboratory activities.

Keywords: *centrifugal pump, pump performance, experimental testing, laboratory training equipment development, digital flow meter.*