ANALISA SINYAL GETARAN *VIBRATION TEST* PADA POMPA SENTRIFUGAL UNTUK PERAWATAN PREDIKTIF DI PDAM TIRTA TERUBUK BENGKALIS

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ABSTRAK

Pompa sentrifugal merupakan komponen vital dalam sistem distribusi air bersih, khususnya di Perusahaan Daerah Air Minum (PDAM) Tirta Terubuk Bengkalis. Kerusakan mendadak pada pompa ini kerap menjadi hambatan dalam pelayanan distribusi air kepada masyarakat. Selama ini, pendekatan perawatan yang diterapkan masih didominasi oleh metode reaktif dan preventif yang kurang efektif dalam mendeteksi potensi kerusakan sejak dini. Penelitian ini bertujuan untuk mengkaji penerapan sistem pemeliharaan prediktif pada pompa sentrifugal melalui analisis sinyal getaran (vibration test) sebagai metode deteksi dini kerusakan. Metode yang digunakan meliputi pengambilan data getaran pada titik-titik kritis pompa menggunakan sensor dan alat vibration analyzer, kemudian dianalisis dengan pendekatan spektrum frekuensi (FFT) untuk mengidentifikasi indikasi kerusakan seperti unbalance, misalignment, dan kerusakan bearing. Hasil penelitian ini diharapkan dapat memberikan gambaran kondisi aktual pompa secara real-time, sehingga tindakan perawatan dapat dilakukan sebelum terjadi gangguan besar. Implementasi sistem pemeliharaan prediktif berbasis analisis getaran ini diharapkan mampu meningkatkan efisiensi operasional, mengurangi biaya perawatan, serta memastikan kontinuitas pelayanan distribusi air bersih secara berkelanjutan di PDAM Tirta Terubuk Bengkalis.

Kata Kunci: Pompa sentrifugal, getaran, vibration test, pemeliharaan prediktif, PDAM, analisis FFT.

VIBRATION TEST SIGNAL ANALYSIS ON CENTRIFUGAL PUMPS FOR PREDICTIVE MAINTENANCE AT PDAM TIRTA TERUBUK BENGKALIS

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ABSTRACT

Centrifugal pumps are a vital component in the clean water distribution system, especially in the Tirta Terubuk Bengkalis Regional Water Company (PDAM). Sudden damage to this pump often becomes an obstacle in water distribution services to the community. So far, the maintenance approach applied is still dominated by reactive and preventive methods that are less effective in detecting potential damage early on. This study aims to examine the application of a predictive maintenance system on centrifugal pumps through vibration signal analysis (vibration test) as a method of early detection of damage. The method used includes taking vibration data at critical points of the pump using sensors and vibration analyzers, then analyzing with a frequency spectrum approach (FFT) to identify indications of damage such as unbalance, misalignment, and bearing damage. The results of this research are expected to provide an overview of the actual condition of the pump in real-time, so that maintenance actions can be taken before major disturbances occur. The implementation of this vibration analysis-based predictive maintenance system is expected to improve operational efficiency, reduce maintenance costs, and ensure the continuity of clean water distribution services in a sustainable manner at PDAM Tirta Terubuk Bengkalis.

Keywords: Centrifugal pump, vibration, vibration test, predictive maintenance, PDAM, FFT analysis.