ABSTRACT

Optimum Motor Sizing, Using a Finite Difference Approach, on Pumping Units Has Significant Cost Savings Benefit

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The need for energy conservation has never been more realised as it is today. This work attempts to illustrate the monetary gains that can be achieved by properly sizing electric motors on sucker rod pumping units.

The method employed utilises the one dimensional dampened wave equation to generate peak polish rod loads (for conventional units only) and the relationship between these loads and horse power requirements (assuming perfect counterbalance). This equation is solved using a finite difference approximation and boundary conditions - time histories of polished rod load and displacement.

Fifty wells were randomly chosen from the North Palo Seco field. Data from these wells were used to carry out runs on the Fortran Program developed, therefore, determining the optimum horse power requirement of the motors.

This was then compared with the actual motor installed on these wells. An economic evaluation was performed using the company's existing electricity billing rates.

The analysis clearly shows that greater emphasis should/must be paid to optimum motor sizing and to early resizing as the well's condition change e.g. increase or decrease in water cuts, production decline etc.