

Oil & Gas Automation

S O L U T I O N S
INNOVATIVE APPROACHES TO EXPLORATION AND PRODUCTION

In This Issue

Higher productivity

Improving well effectiveness by minimizing waste.

Easy well reporting

Quickly get DynaCards and vital well data using free well reporting software.


Free energy analysis

Analyze sucker-rod pump energy usage with our on-line calculator.

In future issues

Watch for these topics in upcoming issues.

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Technically Speaking

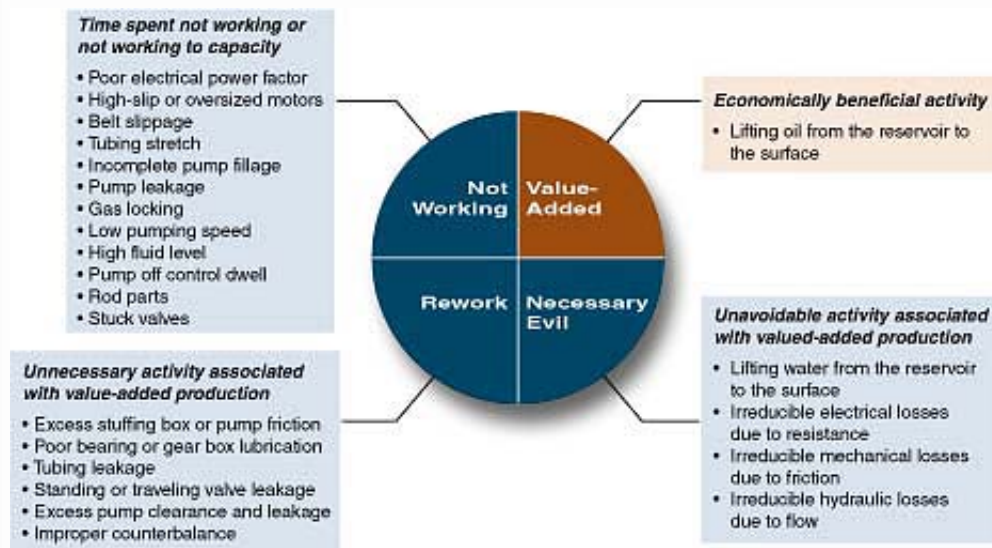


A Novel Way of Conceptualizing the Effectiveness of Artificial Lift Systems

by Rick Tennesen *division manager*

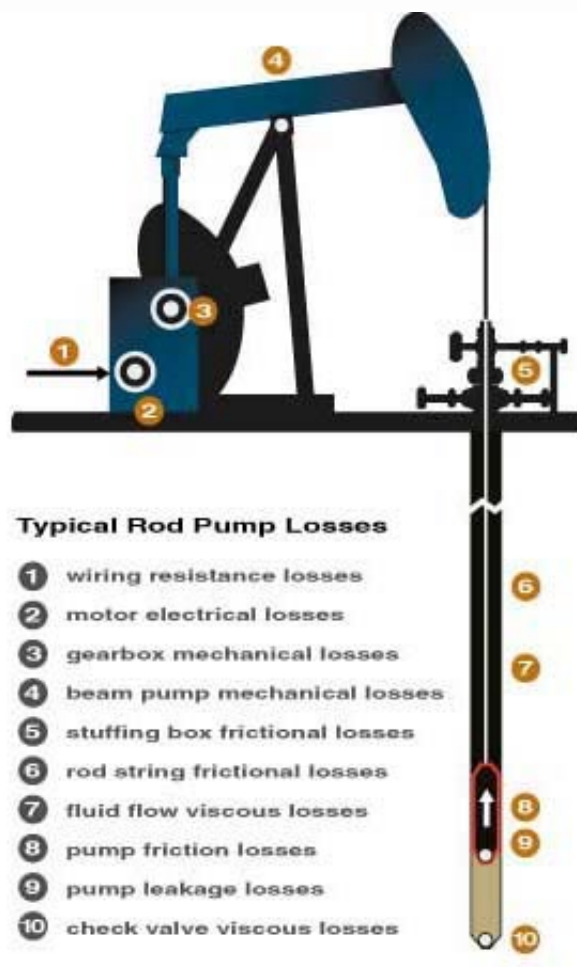
Toyota and others that have achieved high levels of productivity use concepts that emphasize value-added activity. Over the years, they have found that value-added activity (such as mounting the tires on a car) occupies only about 25% of the time of most production workers. The remaining 75% was found to be about equally distributed between rework (such as refinishing door panels), not working (waiting for machine repairs), and necessary evils (dealing with OSHA inspectors).

The interesting observation that Toyota made was that to increase production 50%, all they had to do was eliminate 12.5% of the non-value-added activities. A similar thought process can be applied to artificial lift systems. A small reduction in any of the non-value-added activities can often result in a dramatic improvement in the overall effectiveness of the system.



The concept, as applied to an artificial lift system, is shown graphically above. The only value-added activity of an artificial lift system is moving oil from the reservoir to the surface. While not all of the remaining activities can be controlled, they are all waste and can be categorized as shown by stretching the original definitions a bit.

Rod pumping systems have overall energy efficiencies of 70% at best—and often much lower. An understanding of the various components that rob energy from the system can help in improving overall energy efficiency. While these losses cannot be entirely eliminated, they can be minimized to improve the effectiveness of the artificial lift. The table below illustrates the approximate magnitude of the various loss components in a typical rod pumping system.



Typical Losses in a Rod Pumping System

System Parameters	Value	Power Parameters	Value
Pump Type	Mark II	System Energy Efficiency	44.3%
Pump Speed	9.3 spm	Motor Input Power	38.90 hp
Rod Stroke	149.4 in	Pump Output Power	17.25 hp
Rod String Diameter	0.875 in	Motor Power Loss	7.30 hp
Tubing Diameter	2.441 in	Gearbox Power Loss	2.27 hp
Pump Diameter	1.750 in	Top Friction Loss	0.70 hp
Pump Depth	6375 ft	Bottom Friction Loss	1.19 hp
Fluid Depth	6100 ft	Rod String Viscous Loss	8.97 hp
Fluid Density	0.420 psi/ft	Pump Leakage Loss	1.06 hp
Stuffing Box Friction	100 lb	Tubing Flow Loss	0.09 hp
Pump Friction	200 lb		
Motor Type	High Slip		
Motor Rated Power	60.0 hp		
Motor Rated Speed	1150 rpm		

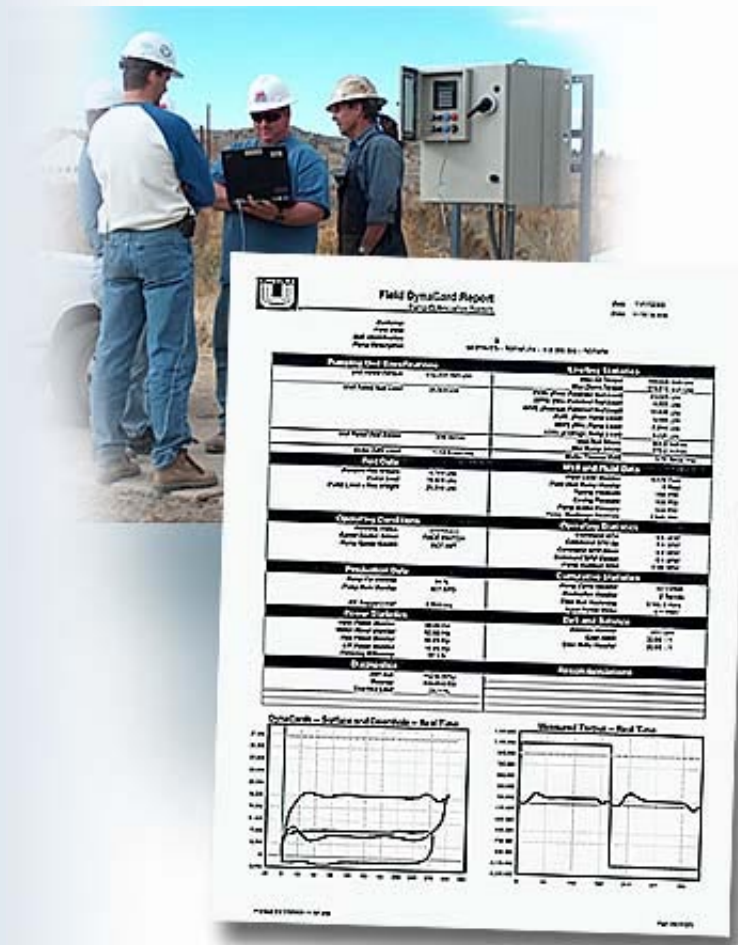
[Contact us](#) for more information on ways to minimize losses and improve the effectiveness of your artificial lifts.

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Product Watch

Free Well Reporting Software Gives DynaCards in Seconds

Unico's new SRP Field DynaCard Report software makes monitoring well performance a breeze. This powerful PC-based tool takes advantage of new reporting capabilities incorporated into the latest release of Unico's SRP software for beam-pump and Rotaflex applications. The software is bundled free of charge with new SRP drives.



With a simple click of the mouse, users can generate, in a matter of seconds, a comprehensive report detailing valuable statistical and analytical information for a given pumping system. Wells can be monitored individually using a direct connection in the field or remotely over a radio link, which enables an entire field to be surveyed quickly and conveniently.

A single-page report provides pumping unit specifications, operating status, production and

power usage statistics, diagnostics, loading statistics, rod data, well and fluid data, and more. Best of all are the real-time surface and downhole dynamometer graphs and the time-based plot of crank torque. Reports can easily be printed or saved, and a Spanish-language version is available at the click of a button.

Thanks to the open nature of the program's development environment,

the report itself is fully customizable. Users familiar with Microsoft Excel and Microsoft Visual Basic for Applications can modify its layout, incorporate their own logo, or add any data items from the drive's global dictionary.

Communication is handled by the Modbus RTU OPC server provided with the program, although any standard OPC server that supports block read functions may be used. The program requires Microsoft Excel and a Unico drive with SRP software 805164 version 12 or higher.

For information on acquiring the SRP Field DynaCard Report software or the latest release of the SRP drive software, please [contact us](#).

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Performance Analysis Tool

SRP Calculator™ Enhanced to Provide Energy Analysis

Unico's SRP Calculator™, a convenient on-line tool for analyzing sucker-rod pumps, now incorporates energy analysis. Input variables have been added for pump utilization, gearbox efficiency, motor efficiency, and utility rate that allow calculation of such energy-related parameters as input



power, lift power, energy efficiency, energy cost per barrel, and monthly electric cost.

The SRP Calculator™ can analyze conventional, phased-crank, air balanced, Mark II, and Rotaflex sucker-rod pumping systems for both vertical and deviated wells.

Try the updated SRP Calculator™ at <http://www.unicous.com/oilgas/srpcalc.php>.

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What's Coming Up

In Future Issues...

Look for the following articles in upcoming issues of *Oil & Gas Automation Solutions*:

Taking advantage of utility rate structures to reduce artificial-lift energy costs

- Using a torque economizer mode to improve efficiency and reduce gearbox stress
- Reducing power consumption and improving power factor of beam pumps
- Field tests of methods to eliminate rod pump gas locking and interference
- Detecting stick/slip oscillations that fatigue rod-string couplings and reduce energy efficiency of PCPs
- The effect of pump off time on average well production

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