Production Optimization

Optimized Fluid Level and Reduced Electrical Consumption Increases Operator Revenue by $821,000 Annually

DynaPump Model 5 operating in Utah

TECHNICAL BACKGROUND

A Coal Bed Methane well was loading up with water inhibiting gas flow from the reservoir. The existing 456 Beam unit with a 120" stroke — running at 9 SPM — did not have the capacity to displace the produced water.

THE DYNAPUMP SOLUTION

A DynaPump Model 5 was installed with a 25 Hp Power Unit. The bottomhole pump was increased from 2" to 2.75" resulting in greater volumetric capacity. The DynaPump also has a longer stroke length than the previous Beam unit. The bigger bottomhole pump in conjunction with the longer stroke increased gross production and lowered the producing fluid level. This resulted in increased gas production of 211 MCF/Day. The Dyna Pump was able to accomplish the increased production while reducing the strokes per minute from 9 to 3 which will invariably reduce the frequency of rod and tubing string failures. An additional benefit of the high efficiency DynaPump was a horsepower reduction of 70%. In summary, The DynaPump solution optimized the customer's production, reduced artificial lift costs and maximized revenue.

PROJECT BENEFITS:

- Increased gas production from 738 MCF/day to 959 MCF/day at $10/MCF
- Optimized producing fluid level
- Reduced strokes per minute from 9 to 3
- Reduced horsepower requirement by 75%

DYNAPUMP is the GREEN Solution!

DynaPump
WELL OPTIMIZATION

2441 High Timbers, The Woodlands, Texas 77380, USA
Phone: 281-973-0050 • Fax: 281-220-6492 • Inquiries: info@DynaPumpInc.com

Production Optimization

Reduced Well Intervention: Zero Failures, Additional Production Increase Operator Revenue by $751,580 Annually!

DynaPump Model 9 operating in West Texas

TECHNICAL BACKGROUND

A West Texas oilwell was put back on production with a 912 Beam unit with 168" stroke length operating at 7.9 strokes per minute. The well experienced 6 failures due to parted rods resulting in 32 days of downtime and incurring significant intervention costs and loss production.

THE DYNAPUMP SOLUTION

A DynaPump Model 9 was installed with a 80 Hp Power Unit. Because the DynaPump Model 9 has a stroke length of 288" versus the 160" stroke length of the 912 Beam unit, the strokes per minute were reduced from 7.9 to 4.3. In addition to the longer stroke, the DynaPump comes standard with a variable frequency drive. This gives DynaPump the ability to reduce rod stress by creating a "soft" rod transition between the up and down strokes. The well has now been operating for over 17 months without any rod failures. The well is also now producing 657 BFPD resulting in 13 incremental BOPD.

PROJECT BENEFITS:

- Saved operator $117,080/year in intervention costs
- Eliminated $160,000 in lost production
- Created 13 incremental BOPD @ $100/bbl

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Production Optimization

Reduced Well Intervention: DynaPump Solution Saves Operator More Than $70,000 During The First 2 Months In Workover Costs Alone!

DynaPump Model 7 operating in Alabama

TECHNICAL BACKGROUND

A Coal Bed Methane well in the Black Warrior Basin near Tuscaloosa, AL was put on production in early January, 2008, using a Rod Driven Progressive Cavity Pump. In the first 2 months, the well experienced multiple failures resulting in over $70K in workover costs alone. The rod string and bottomhole pump were the causes of failure.

THE DYNAPUMP SOLUTION

On Marech 25, 2008, the operator, frustrated with the performance of the PCP, installed a DynaPump Model 7 Pumping Unit with a 60 Hp Power Unit. Because the DynaPump is a long stroking hydraulically driven sucker rod pump, stress on the rod string, tubing string and bottomhole pump is greatly reduced. An additional benefit of the DynaPump is the standard variable speed drive. This allows DynaPump to automatically adjust speed and strokes per minute optimizing fluid production and reducing electrical consumption. Because the DynaPump has exceeded expectations, the operator has already committed to additional units in this field.

PROJECT BENEFITS:

- Eliminated need for workover rig
- No lost production due to well downtime
- Increased runtime by minimizing starts and stops

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DynaPump Features and Benefits

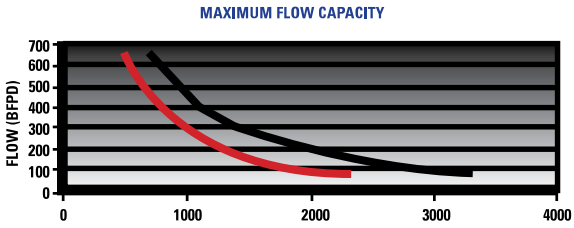
"If it wasn't for DynaPump, we would have never pumped off 35-89 or 10-42"

"If I was to start my own gas company, every pump would be a DynaPump"

"DynaPump has greatly improved our gas field. The water that DynaPump relieved from our wells greatly improved gas production"

"I use a variety of artificial lift methods in my field. DynaPump is by far the easiest to operate. We start them up and let them run"

DynaSave Rod Pumping System



- Low profile, low cost rod pumping system
- Compact (20 units on one truck)
- Cost effective
- Flow up to 640 BPD (500' to 700' deep)
- 72" stroke — adjustable within seconds
- Variable speed and pump off controller included
- Peak polish rod load capacity 7,000 Lbs
- Adjustable strokes per minute
- Low maintenance design

PDA Operator Interface

Total control from a small, easy-to-use handheld device. Read alarms, adjust speed and stroke length, create surface and down hole dynamometer cards. Real time monitoring of rod loads and pumping cycle.

- Read alarms and warnings
- Adjust speed
- Change stroke length
- Adjust pump-off control
- Read runtime statistics
- Create surface and down hole dynamometer cards
- Program communication port parameters
- Conduit for transferring data to Excel

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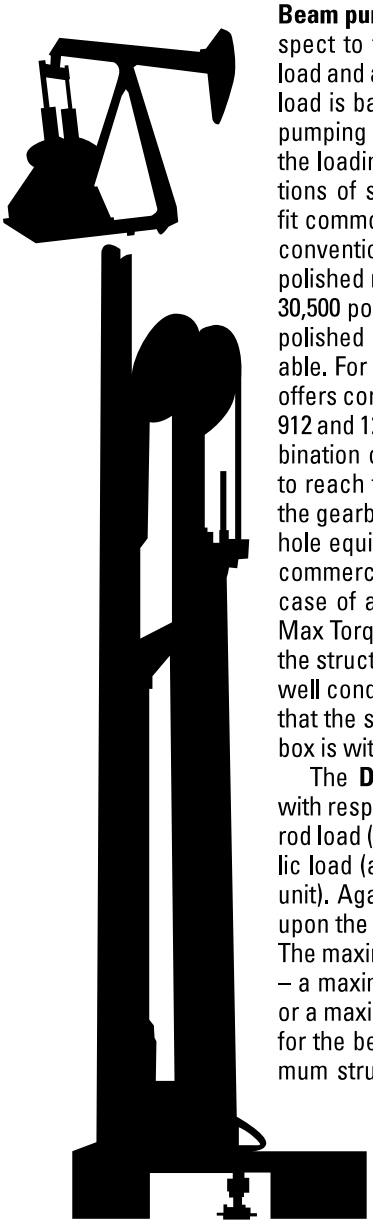
DynaPump vs Beam Pump

Comparing Maximum Loading of the DynaPump to Beam Pumping Units

Written By: Ed Hanzlik, Petroleum Engineer



Beam pumping units have two primary ratings with respect to their lift capacity – a maximum polished rod load and a maximum torque. The maximum polished rod load is based upon the strength of the structure of the pumping unit while the maximum torque is based upon the loading on the reduction gears. Different combinations of structural and torque ratings are matched to fit common well conditions. For example, with a Lufkin conventional unit having a 640 gearbox, three different polished rod load ratings are available – 25,600 pounds, 30,500 pounds and 37,500 pounds. Similarly, for a given polished rod capacity, various torque ratings are available. For a polished rod rating of 30,500 pounds, Lufkin offers conventional units with torque ratings of 456, 640, 912 and 1280 thousand inch-pounds. For any given combination of structure and gearbox, the potential exists to reach the maximum rating of either the structure or the gearbox, depending upon pumping depth and down hole equipment. Examples of this, as calculated by the commercial Rodstar software, are enclosed for the case of a C-1280-365-192 unit. In the example labeled Max Torque, the unit gearbox is overloaded (102%), but the structural load is only 86% of rating. Under different well conditions, the case labeled Max Structure shows that the structure is overloaded (117%) while the gearbox is within rating (97%).

The **DynaPump** unit also has two primary ratings with respect to their lift capacity – a maximum polished rod load (as for the beam unit), and a maximum hydraulic load (analogous to the maximum torque for a beam unit). Again, the maximum polished rod load is based upon the strength of the structure of the wellhead unit. The maximum hydraulic load is based upon two factors – a maximum operating hydraulic pressure of 1700 psi or a maximum counterbalance pressure of 1000 psi. As for the beam unit, it is possible to reach either a maximum structural or a maximum hydraulic (torque) limit for a given DynaPump depending upon well conditions. In its design, the piston surface area against which the counterbalance pressure works results in the maximum counterbalance pressure of 1000 psi being reached at a polished rod load which is extremely close to the maximum structure rating. In the calculation spreadsheet, this shows a red flag in the power hydraulic psi warning box. Inspection of the "CWT PSI" and "HYD PSI" values will show whether it is the counterweight (related to structural loading) exceeding 1000 psi or the power hydraulic pressure exceeding the 1700 psi operating limit.

For simplicity of manufacturing and inventory, DynaPump does not offer multiple combinations of structural load ratings and hydraulic cylinder sizes. DynaPump elected to produce five models with single, standardize combinations of hydraulic cylinder and structural rating which are appropriate for a broad range of applications. This compares to the 73 different combinations offered by Lufkin for conventional beam units. The range of structural loadings for DynaPump's is from 4,000 pounds to 80,000 pounds compared to the range of 5,300 pounds to 42,700 pounds offered by Lufkin conventional units.

Another question which arises is the maximum strokes per minute (SPM) allowable with DynaPump units. DynaPump bases its maximum allowable SPM on a cylinder speed of 200 feet/minute, which gives a polished rod speed of 400 feet/minute. This is equivalent to the allowable speed of Lufkin air-balanced pumping units. According to the formula in the Lufkin catalog, an air-balanced unit with a 240 inch stroke has a maximum speed of 9.96 SPM. This is equivalent to 398 feet/minute. The DynaPump maximum speed, is 10% slower than the permissible speed for Lufkin conventional units, but 12.5% faster than for Lufkin Mark II units.

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