

# **SPE Artificial Lift Conference and Exhibition - Americas 2024**

The Woodlands, Texas, USA  
20 - 22 August 2024

ISBN: 979-8-3313-0307-5

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571

**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2024) by Society of Petroleum Engineers  
All rights reserved.

Printed with permission by Curran Associates, Inc. (2025)

For permission requests, please contact Society of Petroleum Engineers  
at the address below.

Society of Petroleum Engineers  
P. O. Box 833836  
Richardson, Texas 75083-3836

Phone: (800) 456-6863  
Fax: (972) 952-9435

[books@spe.org](mailto:books@spe.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## **ESP - TECHNICAL COMPONENTS AND EQUIPMENT**

Understanding and Expanding the 1 Feet Per Second Rule of Thumb for ESP Motor Heat Transfer .....	1
<i>V. K. Scariot, E. Pereyra, C. Sarica</i>	
Sour Fluid Partial Pressure and Electric Submersible Pumping System Survivability Pattern .....	16
<i>Torty C. Kalu-Ulu</i>	
ESP Application for High Flow and Deep Wells Using a reduced OD Pump with the Biggest Worldwide Single 562 Series Permanent Magnet Motor Adapting Existing VSD .....	26
<i>W. Salazar Vargas, J. Archila, L. Perez, D. Muñoz, O. Rodríguez</i>	
Field Testing of a Novel Gas Processing System for Electric Submersible Pumps.....	37
<i>J. Rhys-Davies, David Luna, J Myska</i>	
ESP Testing: A Key Role in Enhancing Reliability .....	51
<i>B. P. Foresti, A. M. Viana, F. R. R. Bacellar, J. A. G. Silva, M. S. Neves, M. P. Ribeiro, P. S. Oliveira, B. M. P. Costa, D. Cemin, C. F. Sousa</i>	

## **SUCKER ROD EQUIPMENT AND OPERATING**

The Case Study of Measuring the Improvement/Decrease in Compression of Rods after Putting the Rod Pump in Two-Speed Mode Remotely .....	60
<i>H. Janjua, M. Poythress, R. Jordan</i>	
Recyclable Fiber Reinforced Thermoplastic Sucker Rods for Improving Rod Pumping.....	74
<i>J. Saponja, S. David, D. Pipchuk, R. Hari, J. Gothrup, J. Bentsen, C. Smith, T. Kubacak</i>	
Sucker Rod Make Up: All About Displacement, or is it? .....	110
<i>Jordan Anderson, Esteban Oliva, Steve Mogus</i>	
A Tubing Anchor Engineered for Rod Pumping Horizontal Wells Improves Production Performance.....	123
<i>J. Saponja, R. Hari, J. Brignac, D. Jaszan, C. Coyes, F. Chaudhry</i>	
Can we Estimate a Fatigue Life for Sucker Rod Materials?.....	153
<i>M. Bühler, E. Lopez, M. Pereyra, E. Oliva</i>	
Vortex Barbell System Improving Sucker Rod Pump Efficiencies and Decreasing Failure Frequencies in High-Angle Wellbores.....	161
<i>C. Coyes, C. Jensen, J. Hardin, J. Desautels, J. Paez, B. Williams, J. Saponja, D. Holcomb, A. Dixon, R. Beeton</i>	

## **HYBRID SYSTEMS AND PLUNGER LIFT**

Innovative Electric Submersible Plunger Pump System Driven by Linear Permanent Magnet Motor as A Technological Alternative for Conventional Rod Pumps in San Joaquin Basin Wells .....	187
<i>Jairo Ocando, Luis Seczon, Travis Erskine, Ivan Patino, Pavel Sviridov, Joshua Alvidrez, Matthew Mastro</i>	

Plunger Fall Velocity for Production Optimization .....	196
<i>M. Tello, J. Hecht, E. Clem, R. Viggiano, E. Pereyra, C. Sarica</i>	
A Novel Plunger Data Analysis Methodology.....	211
<i>R. Viggiano, M. Micozzi, F. Chaudhry, E. Pereyra, C. Sarica</i>	
Application of Plunger Lift Systems for Deliquification of Challenging Gas Wells in a Mature Gas Field.....	226
<i>Pramod Kumar Verma, Lalnunthuanga Lalnunthuanga, Avinav Kumar, Anjali Verma</i>	
Downhole Peristaltic Pumps as a New Artificial Lift System for Oil and Gas Wells.....	242
<i>Danny J. Perez Romero</i>	

### **PROGRESSING CAVITY PUMPS**

Successful Application of All-Metal PCP in CSS and Steam Flood to Unlock Hard-To-Recover Oil Resources .....	251
<i>Paul Skoczylas, Mohammed Sawafi, Basem Ahmed Salem, Sulaiman Al Jabri, Ahmed Zadjali, Roman Ponomarenko</i>	
Preliminary Fluid Viscosity Correction Factor for Progressing Cavity Pumps .....	258
<i>C. Swaffield, J. Sheldon, E. Noble, P. Skoczylas</i>	
Coated Continuous Sucker Rod Reduces Fatigue Failures in Progressing Cavity Pumping Applications.....	272
<i>L. Dunn, R. Rowan, K. Shanmugam, D. Clarke, T. Orban, C. Giesbrecht, N. Jen, L. Benavides</i>	
Smart-Pump™ Methodology for Progressing Cavity Pump Sizing .....	305
<i>D. B. Larson, Y. Gogenhan, H. S. Parhar, G. A. Ariza Gonzalez, D. E. Salicas, A. Boonstra</i>	
Successful Field Trial of Well Completion with Suitable Artificial Lift in Cbm Horizontal Wells of India.....	313
<i>S. K. Sharan, V. H. Keswani</i>	

### **MACHINE LEARNING AND AI IN ARTIFICIAL LIFT**

Autonomous ESP Optimization Using Machine Learning Demonstrated in the Permian Basin.....	331
<i>R. Erickson, R. Ramos, J. Meek, D. Benham, B. Haapanen, B. Hicks, C. Wheeler, B. Vasylyshyn</i>	
Intelligent Autonomous System for Electrical Submersible Well Based on Metalearning Techniques .....	345
<i>Angel Lacret, Edgar Camargo, Edwin Mendoza, Jose Canelon, Ybeth Lacret</i>	
The Utilization of Machine Learning and Deep Learning to Predict Real-Time ESP Well Status .....	358
<i>A. H. Alquraini, H. H. Al Sadah, M. M. AlBori, M. S. Al-Kadem</i>	
Physics-Informed Reinforcement Learning for Motor Frequency Optimization in Electrical Submersible Pumps: Enhancing AI-Led Decision-Making in Production Optimization .....	366
<i>R. Abdalla, O. Toumi, D. Gönczi, A. Sidaoui, D. Nikolaev, A. Schweiger, G. Schweiger</i>	

### **GAS LIFT - R&D: THERE'S ALWAYS MORE TO LEARN**

Is The Dome Pressure Equal to The Closing Pressure in Nitrogen-Charged Gas-Lift Valves? .....	379
<i>P. J. Waltrich, F. S. Maciel, M. C. Fernandes</i>	

High Pressure Gas Lift Optimization Using Nodal Analysis.....	390
<i>O. Abdelkerim, S. Leggett, J. Lu, W. Nelle, Bob L.</i>	
Design, Development and First Operation of a New Redirected Gas Lift Mandrel .....	405
<i>R. S. Fraga, D. C. Barrionuevo, T. G. Perovano, L. A. O. Guerra, A. R. Almeida, H. T. Rodrigues</i>	
Observing Dynamic Well Behaviour During Gas Lift with Slickline Deployed Distributed Fiber Optic Sensing Helps Diagnose Well Performance Issues in the White Tiger Field Vietnam.....	422
<i>M. J. Webster, N. J. Ferguson, D. Q. Nguyen, M. V. Hoang, N. T. Tran, T. C. Pham, T. H. Vu</i>	
Optimizing Gas Lift Design: Unveiling Ideal Wellhead Temperature Across Diverse Reservoirs at Mehsana Oil Fields.....	430
<i>K. Chanchlani, R. Gogoi, D. Gunwant, H. Rajak, S. Devshali, S. Meena, N. Kote</i>	

### **ARTIFICIAL LIFT IN UNCONVENTIONAL WELLS**

Comparison of Power Quality Between Permanent Magnet Motors and Induction Motors with Different Surface Control Types and Configurations .....	447
<i>Carlos Yicon, Anthony Kalisek, Luis Seczon, Seth Gilstrap</i>	
Combining Gas Lift, PAGL, and Plunger Lift Optimizes Production Across Tight Oil Well Lifecycle.....	464
<i>Brent Cope, David Gilmore</i>	
High-Pressure Gas Lift (HPGL) as an Alternative to Electric Submersible Pumps (ESP) in Wolfcamp Unconventional Wells. An Operational, Economic, and Production Performance Comparison .....	473
<i>Panagiotis Dalamarinis, Craig Hons, Stephen. Fusselman, Isaac Reese, Benjamin Pepple, Steve Schwin, Will Nelle, Ryan Reynolds</i>	
Liquid Management in Gas Wells: Exploring the Impacts of Tubular Restrictions .....	483
<i>Camilo Mateus-Rubiano, Maziad Alsanea, Hamid Karami</i>	
Differentiate Between Pump Off and Gas Interference with Real Time Plunger Velocity .....	499
<i>Russell Messer</i>	
Performance Evaluation for the Combination of Vortex Desander and Hybrid Sand Flowback Device for use with ESP in the Permian Basin.....	507
<i>Neil Johnson Vazhappilly, Gustavo Gonzalez, Shivani Vyas</i>	

### **GAS LIFT IN THE GROUND: NOVEL CASE STUDIES**

Optimization of Oil Production Through Advanced Gas Lift Technology .....	524
<i>M. Ramos, M. Khalifah, R. Almilad, A. Mishkhes</i>	
Gas Lift Optimization in the Permian Using Machine Learning and Artificial Intelligence .....	535
<i>P. Movahed, D. Burmaster, E. Karantinos, A. L. Villarreal, M. Memarzadeh, S. G. Vela, S. C. Tapley, C. Newlin, T. A. Banes</i>	
Learnings from Successful Permian High Pressure Gas Lift Installations .....	552
<i>K. McNeilly, A. Smith, L. K. Harms, W. Nelle, S. Schwin, R. Reynolds</i>	

If It's not Broken, Should You Fix It? A Case Study on the Replacement of a Functional Gas Lift Valve in a Deepwater Well .....	566
<i>T. G. Perovano, A. W. Quintino, B. S. Renato, S. X. Bastos</i>	

## **ESP - PERFORMANCE OPTIMIZATION AND OPERATIONAL CONSIDERATIONS**

Overcoming Power Outages and Disturbances in Power Lines in ESP Operations .....	571
<i>D. A. Guayama, G. Sauer, M. Tejerina, S. Burgos, H. O. Perez, M. C. Orozco, R. A. Oyarzún</i>	
Review of Causes and Remedial Actions of Gas-Induced ESP Downtime in Unconventional Wells.....	589
<i>L Camilleri</i>	
Different-Sized Dual Electrical Submersible Pumps (ESPs) Novel Applications: Sustainable Production and Reduced Carbon Emission .....	615
<i>M. H. Aleid, H. T. Alqudaihi</i>	
ESP Rotary Gas Separator Configuration for Harsh Environments, High Contents of Free Gas, High Temperatures and Viscous Conditions .....	626
<i>Laura Matheus, Ingrid Penagos, Luisa Diaz, Juan Rodriguez, Hyulder Pinzon, Miguel Garzón, Iván Ariza, Camilo González, Pilar Aguinaga, Néstor Devia, David Castro</i>	
Two Decades of ESP Operations at Cerro Dragon, Argentina: A Comprehensive Case Study .....	650
<i>D. A. Guayama, M. Traba, M. C. Orozco, R. H. Teves, R. A. Oyarzún</i>	
Operational History and Future Application of the Subsea ESP Skid Technology in Espadarte Field.....	671
<i>G. M. Paternost, B. M. P. Costa, P. S. Oliveira, J. A. G. Silva, A. G. Nascimento, L. Vergara, A. Watson</i>	

## **SUCKER ROD TECHNOLOGY AND THEORY**

Harnessing Machine Learning for Proactive Detection and Predictive Maintenance of Sticking Pumps in Rod Lift Oil Wells .....	681
<i>Tony Chan, Alan Gallegos, Burke Pond, Chad Dueck</i>	
Analysis of Gas-Liquid Flow in Static Centrifugal Downhole Separators Through CFD.....	693
<i>L. C. Osorio Ojeda, Hamidreza Karami, M. Olubode</i>	
A Detailed Investigation of Gravity-Driven Separation Mechanisms for Horizontal Wells Under Dispersed Flow Conditions .....	705
<i>R. Rosli, E. Pereyra, C. Sarica</i>	
Evaluating Tubing Completions using High-Resolution Gyro Logs to Improve Rod Pumping Systems Run Life .....	725
<i>F. A. Cepeda, B. W. Setiadi, G. A. Alvarez</i>	
Automatic Iteration on Viscous Damping for Optimal SRP Well Control .....	742
<i>V. Pons, J. Gomes</i>	
Determination of Annulus Dynamic Liquid Level from the Motor Current Sensor of Rod Pumps-Real Time Monitoring System (RTMS) at Oil Fields of Mehsana Asset.....	759
<i>K. Chanchlani, H. Rajak, S. Devshali, D. Gunwant, R. Gogoi, J. Dadhich</i>	

## **Author Index**