BLACKBIRD FOR TRAINING

Production Engineering Training to Analyze Well Performance



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Introduction

Production Engineering plays a vital role in maximizing well productivity, improving production efficiency, and ensuring the reliable operation of production systems throughout the asset lifecycle. Achieving consistent production performance requires engineers to understand well behavior, interpret production data, monitor equipment performance, and apply engineering solutions that minimize downtime while optimizing operational efficiency.

This training course provides a practical and comprehensive understanding of Production Engineering, Well Performance Analysis, Production Monitoring, and Artificial Lift Performance. Participants will develop the technical knowledge required to evaluate production systems, assess well productivity, analyze production trends, identify operational constraints, and improve production performance using engineering analysis and performance monitoring techniques.

The course places particular emphasis on Artificial Lift Systems—including Electrical Submersible Pumps ESP, Progressive Cavity Pumps PCP, and Beam Pump Systems—covering performance evaluation, reliability analysis, operational troubleshooting, and production optimization. Through practical engineering approaches, participants will learn how to interpret key performance indicators, evaluate equipment reliability, diagnose operational problems, and implement continuous improvement strategies that enhance production efficiency while reducing maintenance costs and unplanned shutdowns.

Course Objectives

By the end of this training course, participants will be able to:



- Understand the principles and applications of Production Engineering.
- Evaluate production system performance using engineering analysis techniques.
- Interpret production data to assess well productivity and operational performance.
- Monitor well performance using production surveillance and performance monitoring methods.
- Analyze production trends, pressure behavior, and production rates to support operational decision-making.
- Identify production constraints, operational bottlenecks, and factors affecting well performance.
- Evaluate production system efficiency using practical performance assessment methods.
- Select appropriate Artificial Lift Systems based on production conditions and operational objectives.
- Evaluate the operational performance of Electrical Submersible Pumps ESP, Progressive Cavity Pumps PCP, and Beam Pump Systems.
- Monitor Artificial Lift Key Performance Indicators KPIs to improve equipment performance.
- Measure pump efficiency, power consumption, and overall equipment effectiveness.
- Analyze equipment reliability using Failure Rate, Mean Time Between Failure MTBF, Mean Time To Repair MTTR, Equipment Availability, and Run-Life indicators.
- Diagnose well and Artificial Lift operational problems using structured engineering methodologies.
- Apply Root Cause Analysis RCA to identify failure mechanisms and recommend corrective actions.
- Analyze production losses and implement production optimization strategies that improve efficiency, reliability, and operating performance.
- Support continuous improvement initiatives through engineering performance evaluation and reliability monitoring.

Course Outlines

Day 1: Production Engineering Fundamentals and Well Performance

- Principles of Production Engineering and Production Operations
- Production System Architecture and Surface Production Facilities
- Fundamentals of Well Performance
- Well Productivity Indicators and Performance Measurement
- Production Data Collection, Validation, and Measurement Techniques
- Production Surveillance and Performance Monitoring
- Operational Factors Affecting Well Performance
- Introduction to Production System Performance Evaluation

Day 2: Production Performance Evaluation and Well Productivity Analysis

- Well Productivity Assessment Methodologies
- Production Data Interpretation and Engineering Analysis
- Production Trend Evaluation Techniques
- Pressure and Production Rate Analysis
- Production Constraints Identification and Bottleneck Analysis
- Wellbore and Production System Performance Assessment
- Production Performance Evaluation Techniques
- Production Monitoring, Diagnostics, and Optimization Methods



Day 3: Artificial Lift Systems Performance and Optimization

- Fundamentals of Artificial Lift Systems
- Artificial Lift System Selection Methodologies
- Electrical Submersible Pumps ESP: Design, Operation, and Performance
- Progressive Cavity Pumps PCP: Operating Principles and Performance Evaluation
- Beam Pump Systems: Operating Characteristics and Performance Analysis
- Artificial Lift Performance Monitoring Techniques
- Common Operational Challenges in Artificial Lift Systems
- Artificial Lift Design Optimization for Improved Production Performance

Day 4: Artificial Lift Performance Monitoring and Reliability Analysis

- Artificial Lift Performance Monitoring Framework
- Key Performance Indicators KPIs for Artificial Lift Systems
- Pump Efficiency Measurement and Performance Analysis
- Power Consumption Monitoring and Energy Optimization
- Failure Rate Analysis and Reliability Assessment
- Mean Time Between Failure MTBF
- Mean Time To Repair MTTR
- Equipment Availability and Reliability Metrics
- Run-Life Analysis and Performance Benchmarking
- Reliability Improvement Strategies for Artificial Lift Systems

Day 5: Pump Performance Evaluation, Troubleshooting, and Production Optimization

Electrical Submersible Pumps ESP

- Motor Load Monitoring
- Current and Power Consumption Analysis
- Pump Intake Pressure Evaluation
- ESP Efficiency Assessment
- ESP Reliability and Run-Life Monitoring

Progressive Cavity Pumps PCP

- Torque Monitoring and Performance Evaluation
- Pump Fillage Analysis
- Volumetric Efficiency Assessment
- PCP Reliability and Operational Performance Evaluation



Beam Pump Systems

- Pump Fillage Evaluation
- Rod Loading Analysis
- Stroke Length and Stroke Rate Optimization
- Pumping Efficiency Assessment
- Energy Consumption Monitoring

Production Optimization and Operational Troubleshooting

- Well Performance Troubleshooting Techniques
- Artificial Lift Failure Analysis and Corrective Actions
- Root Cause Analysis RCA Methodologies
- Production Loss Analysis
- KPI Dashboards and Performance Monitoring
- Production Optimization Strategies
- Best Practices for Artificial Lift Reliability Improvement
- Continuous Performance Improvement Planning

Day 6: Production Performance Improvement and Engineering Applications

- Integrated Production Performance Evaluation.
- Production System Efficiency Assessment.
- Advanced Production Data Analysis and Engineering Interpretation.
- Engineering Decision-Making for Production Optimization.
- Production Loss Identification and Performance Improvement Planning.
- Artificial Lift Performance Review and Optimization Strategies.
- Engineering Best Practices for Improving Equipment Reliability.

Why Attend This Course: Wins & Losses!

After completing this course, participants will be able to:

- Strengthen their Production Engineering knowledge using practical engineering approaches.
- Improve the evaluation of Well Performance and Production System Performance.
- Interpret Production Data with greater confidence and technical accuracy.
- Enhance Production Monitoring and Production Surveillance capabilities.
- Select and evaluate Artificial Lift Systems more effectively.
- Improve the operational performance of ESP, PCP, and Beam Pump Systems.
- Monitor KPIs that support production efficiency and equipment reliability.
- Reduce equipment failures through proactive reliability analysis.
- Apply MTBF, MTTR, Failure Rate, Equipment Availability, and Run-Life analysis to support maintenance decisions.
- Diagnose production problems and implement effective engineering solutions.
- Increase production efficiency while reducing operating costs and unplanned downtime.
- Support continuous operational improvement through data-driven engineering decisions.



Conclusion

Production Engineering is essential for maintaining efficient production operations, maximizing equipment performance, and supporting sustainable operational excellence. By combining production analysis, performance monitoring, reliability engineering, and Artificial Lift optimization, engineers can significantly improve production efficiency while reducing equipment failures and operational costs.

This course equips participants with practical engineering knowledge and analytical techniques to evaluate well performance, monitor production systems, assess Artificial Lift performance, interpret operational data, and implement production optimization strategies. Upon completion, participants will be prepared to make informed engineering decisions that improve reliability, increase productivity, and support continuous improvement across production operations.

