



## Reciprocating Rod Pumps Fundamentals

### MODULE

#### About the Skill Module

The skill module focuses upon understanding the three main components of a rod pump well completion, namely, the surface unit, the rod string, and the downhole pump. Each pump component is examined and investigated to define specific rod pump completion loading and design parameters. Related overall rod pump design considerations necessary for optimizing pump design and operation are presented. Different types of surface unit configuration geometries are presented with the positives and negative attributes of each discussed. The API rod string design method is reviewed and two rod string designs are then conducted as exercises. Steel and fiberglass rods as well as continuous rod (Weatherford Corod™) designs are illustrated with positive and negative features highlighted. Surface dynamometer data gathering for rod pump optimization is presented. Three complete pump design exercises are worked.

#### Target Audience

Petroleum engineers, production operations staff, reservoir engineers, facilities staff, drilling and completion engineers, geologists, field supervisors and managers, field technicians, service company engineers and managers, and especially engineers starting a work assignment in production engineering and operations or other engineers seeking a well-rounded foundation in production engineering.

#### You Will Learn

Participants will learn how to:

- Apply the working principles and operating characteristics of oilfield reciprocating rod pump artificial lift technology
- Employ the steps necessary to design, maintain, and service rod pump surface unit equipment
- Employ the steps necessary to design, maintain, and service rod pump rod strings
- Employ the steps necessary to design, maintain, and service rod pump downhole pumps
- Develop engineering and operating skills to successfully design, properly set up, maintain, and provide overall service for implementing and applying reciprocating rod pump artificial lift technology
- Illustrate using pictures, animations, sketches, design software, and other media and tools the key mechanisms of rod pump systems
- Design a rod pump rod string using the Modified Goodman method
- Highlight the considerations and adjustments being reviewed by API regarding standards for proper consideration of rod fatigue and related corrosion effects upon rod string design

- Work several rod pump design exercises to assess maximum and minimum pump load, minimum and maximum rod stress, motor selection, strokes per minute, stroke length, and related overall rod pump design parameter selection
- Describe how a rod pump surface dynamometer gathers rod pump loading data over each pump cycle, calculate maximum and minimum rod stress loading, predict downhole pump performance, select rod string taper sizing, select motor horsepower required, and evaluate overall pump performance while identifying rod pump problems, all using a rod pump dynamometer, known as The Analytic and Predictive Tool for reciprocating rod pumps
- Outline the primary causes of rod failure and how the use of rod guides and other auxiliary equipment can mitigate failures, the effect of gear box overload and how to prevent it, the proper selection of rod metallurgy for corrosion conditions, and the need for disciplined inspection of well tubing and rods to minimize failures
- Demonstrate how the use of modern instrumentation “smart well” systems to control pump operation, gather data, and manage pump functions results in optimum pump performance and minimized costs

## Product Details

Categories: Upstream

Disciplines: Production and Completions Engineering

Levels: Foundation

Product Type: Individual Skill Module

Format: On-Demand

Duration: 8 hours (approx.)

**\$795.00**